OCCUPATIONAL SURVEY REPORT
ELECTRONIC PRINCIPLES

(1)

LEVEL II

MISSILE ELECTRONIC MAINTENANCE SPECIALIST

AFSC 31653

AFPT 90-316-222
2 September 1977

OCCUPATIONAL SURVEY BRANCH
USAF OCCUPATIONAL MEASUREMENT CENTER
LACKLAND AFB TEXAS 78236

UNCLASSIFIED

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20 ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned as Missile Electronics Maintenance Specialist (AFSC 31653). The report gives a detailed listing of the technical tasks and knowledge needed to perform the jobs within the specialty or career ladder.

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This specialty has the following functions:

Assembles, installs, calibrates, operates, and maintains instrumental equipment. Assembles, installs, and operates instrumentation and telementry equipment. Repairs, overhauls, and maintains instrumentation systems. Tests and modifies instrumentation components. Supervises instrumentation personnel.

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PREFACE

This report presents a summary of the results of a detailed Air Force Electronic Principles Survey of the Missile Electronic Maintenance Specialist, AFSC 31653.

The Electronic Principles Inventory (EPI) was developed by Major Thomas J. O'Connor and Mr. Hendrick W. Ruck and the survey data were analyzed by Captain Harold T. Welch. All are members of the Occupational Survey Branch, USAF Occupational Measurement Center, Lackland AFB, Texas.

Computer programs for analyzing the data were designed by Dr. Raymond E. Christal, Occupational and Manpower Research Division, Air Force Human Resources Laboratory (AFHRL), and were written by the Project Analysis and Programming Branch, Computational Sciences Division, AFHRL.

Distribution of this report is made upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Survey Branch (OMY), Lackland AFB, Texas 78236.

This report has been reviewed and is approved.

JAMES A. TURNER, JR., Colonel, USAF
Commander
USAF Occupational Measurement Center

WALTER E. DRISKILL, Ph.D.
Chief, Occupational Survey Branch
USAF Occupational Measurement Center

ELECTRONIC PRINCIPLES OCCUPATIONAL SURVEY REPORT
MISSILE ELECTRONIC MAINTENANCE SPECIALIST
AFSC 31653

INTRODUCTION

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned as Missile Electronics Maintenance Specialist (AFSC 31653). The data for this report were collected during the period April through June 1977.

This report describes: (1) development and administration of the survey instrument; and (2) electronic principles used by DAFSC 5-skill level personnel both CONUS and overseas and assigned to selected major commands.

DEVELOPMENT OF THE ELECTRONIC PRINCIPLES INVENTORY (EPI)

The EPI was developed by personnel from the Occupational Survey Branch who were well qualified in theoretical physics and electronics, as well as in task analysis and survey development. Over 300 maintenance personnel from SAC, TAC, ADC, MAC, and AFCS participated in the development of the inventory. Representing the five ATC training centers, electronics experts who averaged 12 years of maintenance experience and four years of electronic principles instruction experience spent several weeks refining the EPI. In addition, personnel at the Electrical Engineering Department of the USAF Academy and the Air Force Human Resources Laboratory were consulted during the development of the inventory.

The final version of the EPI used in this survey contained 1,257 items in 62 subject matter areas covering all electronic principles training given at the five ATC technical training centers. Table 1 lists the 62 subject areas.

ADMINISTRATION

The Electronic Principles Inventory was administered by mail to AFSC 31653 airmen worldwide. Responses from 321 individuals represented 57 percent of the total of all AFSC 31653 personnel. Table 2 shows the percentage distribution by major command of the survey incumbents.

TABLE 1

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
1	MATHEMATICS	A1	2
2	DIRECT CURRENT AND VOLTAGE	A15	2
3	RESISTANCE	A24	2
4	MULTIMETER USES	B52	3
5	ALTERNATING CURRENT	B61	4
6	INDUCTORS AND INDUCTIVE REACTANCE	B67	4
7	CAPACITORS AND CAPACITIVE REACTANCE	C92	5
8	TRANSFORMERS	C128	6
9	MAGNETISM	C171	7
10	RCL CIRCUITS	D185	8
11	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)	D229	10
12	FILTERS	D239	10
13	COUPLING	E261	11
14	SOLDERING	E273	11
15	RELAYS	E295	12
16	MICROPHONES	F314	12
17	SPEAKERS	F327	13
18	OSCILLOSCOPES	F342	13
19	SEMICONDUCTOR DIODES	G354	13
20	TRANSISTORS	G404	15
21	TRANSISTOR AMPLIFIERS	G428	16
22	SOLID-STATE SPECIAL PURPOSE DEVICES	H477	19
23	POWER SUPPLIES	H483	19
24	OSCILLATORS	H512	19
25	MULTIVIBRATORS	I539	20
26	LIMITERS AND CLAMPERS	I555	21
27	ELECTRON TUBES	I565	21
28	ELECTRON TUBE AMPLIFIERS AND CIRCUITS	J609	22
29	SPECIAL PURPOSE ELECTRON TUBES	J616	23
30	HETERODYNING, MODULATION, AND DEMODULATION	J632	23
31	AM SYSTEMS	K638	23
32	FM SYSTEMS	K666	24

TABLE 1 (CONTINUED)

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
33	NUMBERING SYSTEMS	K685	25
34	LOGIC FUNCTIONS	L695	25
35	BOOLEAN EQUATIONS	L708	26
36	COUNTERS	L733	27
37	TIMING CIRCUITS	M757	27
38	USE OF SIGNAL GENERATORS	M769	28
39	MOTORS AND GENERATORS	M779	28
40	METER MOVEMENTS	N808	29
41	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS	N818	29
42	WAVESHAPING CIRCUITS	N834	30
43	SINGLE SIDEBAND SYSTEMS	0845	30
44	PULSE MODULATION SYSTEMS	0875	31
45	ANTENNAS	0914	32
46	TRANSMISSION LINES	P953	34
47	WAVEGUIDES AND CAVITY RESONATORS	P984	35
48	MICROWAVE AMPLIFIERS AND OSCILLATORS	P1034	37
49	REGISTERS	Q1110	39
50	STORAGE DEVICES	Q1117	40
51	DIGITAL TO ANALOG CONVERTERS	Q1126	40
52	PHANTASTRONS	Q1140	41
53	SCHMITT TRIGGERS	R1141	41
54	CABLE FABRICATION	R1144	41
55	INPUT/OUTPUT DEVICES	S1146	41
56	PHOTO SENSITIVE DEVICES	S1149	41
57	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)	S1150	41
58	INFRARED	T1159	41
59	LASERS	T1136	42
60	DISPLAY TUBES	T1220	43
61	PROGRAMMING	U1234	43
62	DB AND POWER RATIOS	U1255	44

TABLE 2

COMMAND REPRESENTATION OF SURVEY SAMPLE

	31653	
COMMAND	PERCENT ASSIGNED	PERCENT OF SAMPLE
AFSC	76	76
SAC	6	8
AFCS	6	7
ATC	4	6
OTHERS	8	3
TOTAL	100	100

Total Assigned - 500
Total Sampled - 321
Percent Sampled - 57%

PRESENTATON OF RESULTS

Personnel responded "yes" or "no" to the 1,257 electronic principles questions as related to their present job. A Group Summary (GPSUM) computer printout is provided in the Appendix portion of this report. Page 1 of the GPSUM lists the three selected groups identified for this report. Pages 2-44 show the percentage of the incumbents responding to the EPI items. The computer program results display the percent members answering "yes" to the subject area questions. The reader can locate a specific subject area by referring to the Appendix page number as listed in Table 1. For example, the Transformers area results are given on page 6 of the GPSUM. The percentage of survey respondents indicating use of specific electronic principles ranged from high in areas such as Multimeter Uses (p. 3) and Soldering (p. 11) to low in areas such as Waveguides and Cavity Resonators (pp. 35-37) and Display Tubes (p. 43). Additional AFSC 31653 data can be obtained upon request to the Chief, Occupational Survey Branch (OMY).

APPENDIX

PCT MBRS RESPONDING 'YES' BY SELECTED GRPS GPSM74 PAGE 1

TABULATION OF ELECTRONIC PRINCIPLES UTILIZATION DATA FOR SELECTED GROUPS
IN THE 31653 CAREER FIELD.

REPORTS ON THE FOLLOWING GROUPS WERE REQUESTED

GROUP IDENTITY = SPC076	ALL AIRMEN DAFSC 31653	CONTAINING	321 MEMBERS.
GROUP IDENTITY = SPC077	ALL AIRMEN DAFSC 31653 ASSIGNED AFSC	CONTAINING	245 MEMBERS.
GROUP IDENTITY = SPC078	ALL AIRMEN DAFSC 31653 NOT ASSIGNED TO AFSC	CONTAINING	76 MEMBERS.

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			DY-TSK	SPC 076	SPC 077	SPC 078	
A	1	A1-01	IN YOUR PRESENT JOB, DO YOU USE INSTRUMENTS, SUCH AS METERS OR OSCILLOSCOPES, IN WHICH IT IS NECESSARY TO AMPLIFY OR ATTENUATE VOLTAGE, RESISTANCE, ETC., BY POWERS OF 10.	79	81	75	
A	2	A1-02	DO YOU USE PUBLICATIONS, SUCH AS A TECHNICAL ORDERS OR MAINTENANCE MANUALS, IN WHICH IT IS NECESSARY FOR YOU TO MULTIPLY OR DIVIDE BY A POWER OF 10 BEFORE YOU CAN APPLY THE INFORMATION FROM THE PUBLICATION IN A USEFUL WAY ON THE JOB.	30	30	30	
A	3	A1-03	DO YOU REARRANGE AND SOLVE FORMULAS OR EQUATIONS.	37	37	36	MATHEMATICS
A	4	A1-04	DO YOU CALCULATE THE SQUARE ROOT OF A QUANTITY.	17	18	13	
A	5	A1-05	DO YOU SOLVE FOR UNKNOWN QUANTITIES.	37	36	36	
A	6	A1-06	DO YOU CONVERT NUMBERS TO LOGARITHMS.	8	8	9	
A	7	A1-07	DO YOU USE LOGARITHM TABLES IN ANY TYPE OF CALCULATIONS.	11	10	14	
A	8	A1-08	DO YOU SOLVE QUADRATIC EQUATIONS.	10	9	12	
A	9	A1-09	DO YOU USE THE NATURAL SYSTEM OF LOGARITHMS.	7	8	4	
A	10	A1-10	DO YOU PERFORM CALCULATIONS ON VECTOR QUANTITIES.	14	11	26	
A	11	A1-11	DO YOU WORK WITH TRIGONOMETRIC FUNCTIONS SUCH AS SINE, COSINE, OR TANGENT.	14	15	9	
A	12	A1-12	DO YOU DETERMINE AREAS OF PLANE FIGURES.	9	10	5	
A	13	A1-13	DO YOU SOLVE OR USE SIMULTANEOUS EQUATIONS.	10	10	9	
A	14	A1-14	DO YOU SOLVE OR USE PROPORTIONS.	25	26	22	
A	15	A2-01	DO YOU USE THE TERM VOLTAGE OR VOLT (V).	96	96	95	
A	16	A2-02	DO YOU USE THE TERM ELECTROMOTIVE FORCE (EMF).	37	36	41	DIRECT CURRENT AND VOLTAGE
A	17	A2-03	DO YOU USE THE TERM OHM.	94	94	93	
A	18	A2-04	DO YOU USE THE TERM ION.	16	16	14	
A	19	A2-05	DO YOU USE THE TERM DYNE.	8	7	13	
A	20	A2-06	DO YOU USE THE TERM AMPERE.	94	94	92	
A	21	A2-07	DO YOU USE THE TERM NEUTRON.	14	13	17	
A	22	A2-08	DO YOU USE THE TERM COULOMB.	18	19	17	
A	23	A2-09	DO YOU USE THE TERM PROTON.	15	13	21	
A	24	A3-01	DO YOU WORK WITH RESISTORS IN YOUR PRESENT JOB.	77	78	76	
A	25	A3-02	DO YOU INSPECT RESISTORS.	73	77	59	
A	26	A3-03	DO YOU CLEAN RESISTORS.	46	51	33	RESISTANCE
A	27	A3-04	DO YOU ADJUST RESISTORS.	72	74	66	
A	28	A3-05	DO YOU CHECK OHMIC VALUE OF RESISTORS.	79	82	70	
A	29	A3-06	DO YOU REMOVE OR REPLACE RESISTORS.	75	82	50	
A	30	A3-07	DO YOU USE OR REFER TO TEMPERATURE COEFFICIENTS FOR RESISTORS ON ANY TASKS YOU PERFORM.	29	31	22	
A	31	A3-08	DO YOU USE OR REFER TO RESISTOR SYMBOLS SUCH AS FIXED RESISTOR SYMBOLS OR TAPPED RESISTOR SYMBOLS.	75	77	68	
A	32	A3-09	DO YOU IDENTIFY OR CLASSIFY THE RESISTORS YOU WORK WITH AS CARBON, FIXED WIRE, SLIDE TAP, RHEOSTAT, OR POTENTIOMETER.	74	75	68	
A	33	A3-10	DO YOU USE RESISTOR COLOR CODES WHICH INDICATE OHMIC VALUE OF RESISTANCE.	78	83	61	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078	
A	34	A3-11 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE TOLERANCE.	73	80	53	
A	35	A3-12 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE FAILURE RATE.	19	21	13	
A	36	A3-13 DO YOU MAKE DECISIONS IN WHICH YOU MUST DETERMINE HOW TWO OR MORE BATTERIES MUST BE CONNECTED TOGETHER TO ACHIEVE A SPECIFIC VOLTAGE.	36	36	33	
A	37	A3-14 DO YOU USE OR REFER TO THE SCHEMATIC SYMBOLS WHICH REPRESENT BATTERIES, FUSES, CONDUCTORS, LAMPS, OR SWITCHES	80	82	75	
A	38	A3-15 DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES RESISTIVE CIRCUITS.	54	55	53	
A	39	A3-16 DO YOU CALCULATE TOTAL CURRENT FOR SERIES RESISTIVE CIRCUITS.	48	49	43	
A	40	A3-17 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES RESISTIVE CIRCUITS.	52	54	47	
A	41	A3-18 DO YOU CALCULATE POWER DISSIPATION FOR SERIES RESISTIVE CIRCUITS.	40	41	36	
A	42	A3-19 DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES PARALLEL RESISTIVE CIRCUITS.	51	52	49	
A	43	A3-20 DO YOU CALCULATE TOTAL CURRENT FOR SERIES PARALLEL RESISTIVE CIRCUITS.	48	49	42	
A	44	A3-21 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES PARALLEL RESISTIVE CIRCUITS.	48	49	45	
A	45	A3-22 DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR SERIES PARALLEL RESISTIVE CIRCUITS.	41	43	34	
A	46	A3-23 DO YOU CALCULATE POWER DISSIPATION FOR SERIES PARALLEL RESISTIVE CIRCUITS.	38	40	34	
A	47	A3-24 DO YOU CALCULATE TOTAL RESISTANCE FOR PARALLEL RESISTIVE CIRCUITS.	50	52	43	
A	48	A3-25 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RESISTIVE CIRCUITS.	46	49	39	
A	49	A3-26 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR PARALLEL RESISTIVE CIRCUITS.	45	48	36	
A	50	A3-27 DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR PARALLEL RESISTIVE CIRCUITS.	41	44	33	
A	51	A3-28 DO YOU CALCULATE POWER DISSIPATION FOR PARALLEL RESISTIVE CIRCUITS.	37	39	32	
B	52	B1-01 DO YOU MEASURE RESISTANCE.	88	87	89	
B	53	B1-02 DO YOU REPAIR OHMMETERS.	6	5	9	
B	54	B1-03 DO YOU MEASURE VOLTAGE.	92	92	91	MULTIMETER USES
B	55	B1-04 DO YOU REPAIR VOLTMETERS.	5	4	7	
B	56	B1-05 DO YOU REPAIR AMMETERS.	5	4	7	
B	57	B1-06 DO YOU MEASURE CURRENT.	79	80	74	
B	58	B1-07 DO YOU USE MULTIMETERS.	92	92	93	
B	59	B1-08 DO YOU DIRECTLY USE A QUANTITY OF CHARGE CALLED A COULOMB.	7	7	5	
B	60	B1-09 DO YOU READ SCHEMATICS.	87	85	92	

PCT MBRS RESPONDING 'YES' BY SELECTED GRPS — GPSM24 PAGE 4

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078	
B	61	B2-01 DO YOU USE OR REFER TO THE TERM EFFECTIVE VOLTAGE (RMS).	71	73	66	ALTERNATING CURRENT
B	62	B2-02 DO YOU USE OR REFER TO THE TERM PEAK TO PEAK VOLTAGE.	80	80	78	
B	63	B2-03 DO YOU USE OR REFER TO THE TERM AVERAGE VOLTAGE (DC).	64	66	59	
B	64	B2-04 DO YOU USE OR REFER TO THE TERM WAVE LENGTH.	55	56	54	
B	65	B2-05 DO YOU USE OR REFER TO THE TERM FREQUENCY.	86	88	87	
B	66	B2-06 DO YOU USE OR REFER TO THE TERM INSTANTANEOUS VALUE.	30	30	30	
B	67	B3-01 DO YOU WORK WITH INDUCTORS OR CIRCUITS CONTAINING INDUCTORS, CHOKES, OR CHOKE COILS IN YOUR PRESENT JOB.	38	38	36	
B	68	B3-02 DO YOU INSPECT INDUCTORS.	35	39	29	INDUCTORS AND INDUCTIVE REACTANCE
B	69	B3-03 DO YOU CLEAN INDUCTORS.	21	25	11	
B	70	B3-04 DO YOU ADJUST INDUCTORS.	29	32	18	
B	71	B3-05 DO YOU REMOVE OR REPLACE INDUCTORS.	35	40	20	
B	72	B3-06 DO YOU USE OR REFER TO INDUCTANCE.	37	39	32	
B	73	B3-07 DO YOU USE OR REFER TO HENRIES.	30	31	28	
B	74	B3-08 DO YOU USE OR REFER TO INDUCTIVE REACTANCE.	27	28	26	
B	75	B3-09 DO YOU USE OR REFER TO COPPER LOSS IN INDUCTORS.	7	4	13	
B	76	B3-10 DO YOU USE OR REFER TO HYSTERESIS LOSS IN INDUCTORS.	11	10	16	
B	77	B3-11 DO YOU USE OR REFER TO EDDY CURRENT LOSS IN INDUCTORS	8	8	8	
B	78	B3-12 DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTANCE IS PROPORTIONAL TO THE SQUARE OF THE NUMBER OF TURNS OF THE COIL.	6	6	7	
B	79	B3-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE CROSS SECTIONAL AREA OF THE CORE.	6	5	9	
B	80	B3-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS INVERSELY PROPORTIONAL TO ITS LENGTH.	7	7	9	
B	81	B3-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE PERMEABILITY OF THE CORE MATERIAL.	9	8	12	
B	82	B3-16 DO YOU CALCULATE INDUCTANCE FOR PARTICULAR INDUCTORS USING FORMULAS.	9	8	12	
B	83	B3-17 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTANCE IN SERIES.	12	10	17	
B	84	B3-18 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN PARALLEL.	11	10	16	
B	85	B3-19 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN SERIES-PARALLEL CIRCUITS.	10	9	14	
B	86	B3-20 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LAGS VOLTAGE IN AC INDUCTOR CIRCUITS.	22	21	26	
B	87	B3-21 DO YOU CALCULATE INDUCTIVE REACTANCE.	13	11	18	
B	88	B3-22 DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTIVE REACTANCE IS DIRECTLY PROPORTIONAL TO FREQUENCY.	17	17	18	
B	89	B3-23 DO YOU WORK WITH POWER INDUCTORS.	16	18	9	
B	90	B3-24 DO YOU WORK WITH AUDIO FREQUENCY INDUCTORS.	23	25	18	
B	91	B3-25 DO YOU WORK WITH RADIO FREQUENCY INDUCTORS.	27	29	18	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			SPC 076	SPC 077	SPC 078	
		BY-TSK				
C 92	C1-01	DO YOU WORK WITH CAPACITORS OR CIRCUITS CONTAINING CAPACITORS IN YOUR PRESENT JOB.	66	67	63	CAPACITORS AND CAPACITIVE REACTANCE
C 93	C1-02	DO YOU INSPECT CAPACITORS.	40	47	39	
C 94	C1-03	DO YOU CLEAN CAPACITORS.	38	44	18	
C 95	C1-04	DO YOU ADJUST CAPACITORS.	43	48	29	
C 96	C1-05	DO YOU TEST CAPACITORS.	55	60	42	
C 97	C1-06	DO YOU DISCHARGE CAPACITORS.	50	56	34	
C 98	C1-07	DO YOU REMOVE OR REPLACE CAPACITORS.	63	68	45	
C 99	C1-08	DO YOU USE OR REFER TO DISTRIBUTED CAPACITANCE.	14	13	14	
C 100	C1-09	DO YOU USE OR REFER TO ORBITAL STRESS OF ELECTRONS IN A DIELECTRIC.	5	3	11	
C 101	C1-10	DO YOU USE OR REFER TO FARADS, MICROFARADS, OR PICOFARADS.	64	67	56	
C 102	C1-11	DO YOU USE OR REFER TO CAPACITANCE.	63	67	50	
C 103	C1-12	DO YOU USE OR REFER TO DIELECTRIC CONSTANT	14	13	17	
C 104	C1-13	DO YOU USE OR REFER TO WORKING VOLTAGE RATING OF CAPACITORS	52	57	36	
C 105	C1-14	DO YOU USE OR REFER TO CAPACITIVE REACTANCE	35	35	36	
C 106	C1-15	DO YOU USE OR REFER TO CAPACITOR COLOR CODES	24	27	14	
C 107	C1-16	DO YOU WORK WITH CAPACITORS IN DC CIRCUITS	64	69	49	
C 108	C1-17	DO YOU WORK WITH CAPACITORS IN AC CIRCUITS	61	64	50	
C 109	C1-18	DO YOU WORK WITH CAPACITORS IN CIRCUITS WITH BOTH DC AND AC	60	63	50	
C 110	C1-19	DO YOU WORK WITH CAPACITORS IN DON'T REMEMBER WHICH CIRCUITS	8	9	5	
C 111	C1-20	DO YOU CALCULATE CAPACITANCE FOR PARTICULAR CAPACITORS USING FORMULAS	13	14	12	
C 112	C1-21	DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITANCE OF A CAPACITOR IS DIRECTLY PROPORTIONAL TO THE DIELECTRIC CONSTANT	8	7	13	
C 113	C1-22	DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITANCE OF A CAPACITOR IS INVERSELY PROPORTIONAL TO THE DIELECTRIC THICKNESS	11	9	16	
C 114	C1-23	DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN SERIES	24	28	20	
C 115	C1-24	DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN PARALLEL	27	29	20	
C 116	C1-25	DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN SERIES-PARALLEL CIRCUITS	19	21	13	
C 117	C1-26	DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT DOES NOT FLOW THROUGH CAPACITORS, IT ONLY APPEARS TO DO SO	30	29	32	
C 118	C1-27	DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LEADS VOLTAGE IN AC CAPACITOR CIRCUITS	27	27	29	
C 119	C1-28	DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITIVE REACTANCE IS INVERSELY PROPORTIONAL TO FREQUENCY	23	22	26	
C 120	C1-29	DO YOU CALCULATE CAPACITIVE REACTANCE	15	15	13	

PCT MBRS RESPONDING 'YES' BY SELECTED GRPS — GPSM76 PAGE 4

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC U76	SPC U77	SPC U78	
C 121	C1-30 DO YOU WORK WITH ROTOR-STATOR (VARIABLE) CAPACITORS	36	39	28	
C 122	C1-31 DO YOU WORK WITH COMPRESSION (TRIMMER) CAPACITORS	31	32	26	
C 123	C1-32 DO YOU WORK WITH ELECTROLYTIC (FIXED) CAPACITORS	62	65	50	
C 124	C1-33 DO YOU WORK WITH PAPER (FIXED) CAPACITORS	51	57	32	
C 125	C1-34 DO YOU WORK WITH MICA (FIXED) CAPACITORS	54	59	37	
C 126	C1-35 DO YOU WORK WITH CERAMIC (FIXED) CAPACITORS	59	65	39	
C 127	C1-36 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF CAPACITORS	12	12	12	
C 128	C2-01 DO YOU WORK WITH TRANSFORMERS IN YOUR PRESENT JOB	48	50	41	
C 129	C2-02 DO YOU INSPECT TRANSFORMERS	39	44	24	TRANSFORMERS
C 130	C2-03 DO YOU CLEAN TRANSFORMERS	25	30	11	
C 131	C2-04 DO YOU ADJUST TRANSFORMERS	21	22	16	
C 132	C2-05 DO YOU TROUBLESHOOT TRANSFORMERS	36	40	24	
C 133	C2-06 DO YOU REMOVE OR REPLACE COMPLETE TRANSFORMERS	43	49	22	
C 134	C2-07 DO YOU REMOVE OR REPLACE TRANSFORMER PARTS, SUCH AS THE PRIMARY WINDING	4	6	0	
C 135	C2-08 DO YOU MAKE A DISTINCTION BETWEEN MUTUAL INDUCTION AND MUTUAL INDUCTANCE (M)	6	6	7	
C 136	C2-09 DO YOU USE THE SYMBOL FOR MUTUAL INDUCTANCE, M	6	6	7	
C 137	C2-10 DO YOU REFER TO OR USE THE COEFFICIENT OF COUPLING WHEN WORKING WITH TRANSFORMERS	9	8	12	
C 138	C2-11 DO YOU CALCULATE TURNS RATIOS FOR TRANSFORMERS USING CURRENT OR VOLTAGE RATIOS	11	10	12	
C 139	C2-12 DO YOU REFER TO REFLECTED IMPEDANCE WHEN WORKING WITH TRANSFORMERS	6	7	4	
C 140	C2-13 DO YOU CALCULATE IMPEDANCE INTERACTIONS FOR TRANSFORMERS	6	6	4	
C 141	C2-14 DO YOU WORK WITH AUTOTRANSFORMERS	11	11	11	
C 142	C2-15 DO YOU WORK WITH POWER TRANSFORMERS	45	50	30	
C 143	C2-16 DO YOU WORK WITH AUDIO TRANSFORMERS	28	30	21	
C 144	C2-17 DO YOU WORK WITH RADIO FREQUENCY TRANSFORMERS	26	27	21	
C 145	C2-18 DO YOU WORK WITH DON'T REMEMBER WHAT TYPE OF TRANSFORMERS	6	6	5	
C 146	C2-19 DO YOU CHECK TRANSFORMERS FOR OPEN WINDINGS BY MEASURING RESISTANCE	37	40	28	
C 147	C2-20 DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING RESISTANCE	33	37	20	
C 148	C2-21 DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING OUTPUT VOLTAGES	32	35	25	
C 149	C2-22 DO YOU MEASURE RESISTANCE OF TRANSFORMER WINDINGS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	14	16	9	
C 150	C2-23 DO YOU MEASURE OUTPUT VOLTAGE OF TRANSFORMERS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	23	25	14	
C 151	C2-24 DO YOU REFER TO BASIC TRANSFORMER SCHEMATIC SYMBOLS FOR TRANSFORMERS	48	49	42	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			DY-TSK	SPC 076	SPC 077	SPC 078	
C	152	C2-25	DO YOU REFER TO MULTIPLE SECONDARY-WINDINGS SCHEMATIC SYMBOLS FOR TRANSFORMERS	38	41	30	
C	153	C2-26	DO YOU REFER TO MULTIPLE TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	42	45	33	
C	154	C2-27	DO YOU REFER TO CENTER TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	46	48	38	
C	155	C2-28	DO YOU REFER TO AIR CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	30	30	30	
C	156	C2-29	DO YOU REFER TO IRON CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	35	35	34	
C	157	C2-30	DO YOU REFER TO COMBINATIONS OF THE ABOVE SCHEMATIC SYMBOLS FOR TRANSFORMERS	37	37	37	
C	158	C2-31	DO YOU DETERMINE PHASE RELATIONSHIPS BETWEEN SECONDARY AND PRIMARY VOLTAGES OF TRANSFORMERS USING SCHEMATIC SYMBOLS	17	18	14	
C	159	C2-32	DO YOU DETERMINE OR REFER TO THE TYPE OF CORE IN TRANSFORMERS YOU WORK WITH	14	16	9	
C	160	C2-33	DO YOU REFER TO OR USE THE GENERAL RULE THAT THE TURNS RATIO OF A TRANSFORMER IS EQUAL TO THE VOLTAGE RATIO	12	12	12	
C	161	C2-34	DO YOU USE OR REFER TO STEP-UP OR STEP-DOWN RATIOS FOR TRANSFORMERS	23	24	18	
C	162	C2-35	DO YOU CALCULATE VOLTAGE RATIOS FOR TRANSFORMERS USING TURNS RATIOS	10	10	8	
C	163	C2-36	DO YOU CALCULATE CURRENT RATIOS FOR TRANSFORMERS USING TURNS RATIOS	8	8	8	
C	164	C2-37	DOES YOUR JOB INVOLVE ANY TASKS DEALING WITH THREE PHASE TRANSFORMERS	15	16	11	
C	165	C2-38	DO YOU INSPECT THREE PHASE TRANSFORMERS	8	8	7	
C	166	C2-39	DO YOU CLEAN OR LUBRICATE THREE PHASE TRANSFORMERS	3	4	1	
C	167	C2-40	DO YOU ADJUST THREE PHASE TRANSFORMERS	3	3	3	
C	168	C2-41	DO YOU TROUBLESHOOT THREE PHASE TRANSFORMERS	6	7	5	
C	169	C2-42	DO YOU REMOVE OR REPLACE COMPLETE THREE PHASE TRANSFORMERS	9	10	7	
C	170	C2-43	DO YOU REMOVE OR REPLACE THREE PHASE TRANSFORMER PARTS SUCH AS WINDINGS	2	2	1	
C	171	C3-01	DO YOU USE OR REFER TO PERMANENT MAGNETS	30	29	32	
C	172	C3-02	DO YOU USE OR REFER TO TEMPORARY MAGNETS	26	24	30	
C	173	C3-03	DO YOU USE OR REFER TO RETENTIVITY OF MAGNETIC MATERIALS	17	15	22	MAGNETISM
C	174	C3-04	DO YOU USE OR REFER TO RELUCTANCE OF MAGNETIC MATERIALS	13	11	18	
C	175	C3-05	DO YOU USE OR REFER TO PERMEABILITY OF MAGNETIC MATERIALS	17	15	24	
C	176	C3-06	DO YOU USE OR REFER TO RESIDUAL MAGNETISM	26	25	28	
C	177	C3-07	DO YOU USE OR REFER TO MAGNETIC LINES OF FORCE OR FLUX	29	26	37	
C	178	C3-08	DO YOU USE OR REFER TO WEBER'S THEORY OF MAGNETISM	4	4	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
C 179	C3-09 DO YOU USE OR REFER TO DOMAIN THEORY OF MAGNETISM	5	4	7	
C 180	C3-10 DO YOU USE OR REFER TO MAGNETIC INDUCTION	26	25	28	
C 181	C3-11 DO YOU USE OR REFER TO FLUX DENSITY	22	21	25	
C 182	C3-12 DO YOU USE OR REFER TO THE GENERAL RULE THAT FOR MAGNETIC POLES, LIKE POLES REPEL AND UNLIKE POLES ATTRACT	34	34	34	
C 183	C3-13 DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE DIRECTION OF MAGNETIC FIELDS ABOUT STRAIGHT WIRES	23	21	28	
C 184	C3-14 DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE NORTH POLE OF A CURRENT CARRYING COIL	16	16	18	
D 185	D1-01 DO YOU WORK WITH RC, LR, RCL CIRCUITS IN YOUR PRESENT JOB	33	33	33	
D 186	D1-02 DO YOU USE OR REFER TO VECTORS WHEN WORKING WITH RCL CIRCUITS	10	9	13	RCL CIRCUITS
D 187	D1-03 DO YOU USE OR REFER TO PYTHAGOREAN THEOREM WHEN WORKING WITH RCL CIRCUITS	8	7	12	
D 188	D1-04 DO YOU USE OR REFER TO SINE WHEN WORKING WITH RCL CIRCUITS	8	9	3	
D 189	D1-05 DO YOU USE OR REFER TO COSINE WHEN WORKING WITH RCL CIRCUITS	7	9	3	
D 190	D1-06 DO YOU USE OR REFER TO TANGENT WHEN WORKING WITH RCL CIRCUITS	6	7	3	
D 191	D1-07 DO YOU USE OR REFER TO WATTS WHEN WORKING WITH RCL CIRCUITS	23	23	22	
D 192	D1-08 DO YOU USE OR REFER TO TRUE POWER (PT) WHEN WORKING WITH RCL CIRCUITS	11	10	12	
D 193	D1-09 DO YOU USE OR REFER TO MAXIMUM POWER (PM) WHEN WORKING WITH RCL CIRCUITS	12	13	9	
D 194	D1-10 DO YOU USE OR REFER TO AVERAGE POWER (PAVE) WHEN WORKING WITH RCL CIRCUITS	15	14	17	
D 195	D1-11 DO YOU USE OR REFER TO APPARENT POWER (PA) WHEN WORKING WITH RCL CIRCUITS	9	9	8	
D 196	D1-12 DO YOU USE OR REFER TO POWER FACTOR (PF) WHEN WORKING WITH RCL CIRCUITS	9	9	9	
D 197	D1-13 DO YOU USE OR REFER TO RESONANT CIRCUITS WHEN WORKING WITH RCL CIRCUITS	30	30	29	
D 198	D1-14 DO YOU USE OR REFER TO BANDWIDTH WHEN WORKING WITH RCL CIRCUITS	31	31	32	
D 199	D1-15 DO YOU USE OR REFER TO SELECTIVITY WHEN WORKING WITH RCL CIRCUITS	27	26	32	
D 200	D1-16 DO YOU USE OR REFER TO RESONANT FREQUENCY WHEN WORKING WITH RCL CIRCUITS	29	29	29	
D 201	D1-17 DO YOU USE OR REFER TO HALF POWER POINTS WHEN WORKING WITH RCL CIRCUITS	8	8	11	
D 202	D1-18 DO YOU USE OR REFER TO BANDPASS REGION WHEN WORKING WITH RCL CIRCUITS	24	24	25	
D 203	D1-19 DO YOU USE OR REFER TO CIRCUIT Q WHEN WORKING WITH RCL CIRCUITS	20	18	24	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 079
D 204	D1-20 DO YOU USE OR REFER TO TANK CIRCUITS WHEN WORKING WITH RCL CIRCUITS	26	26	25
D 205	D1-21 DO YOU DETERMINE VALUES OF TRIGONOMETRIC FUNCTIONS USING FORMULAS	7	8	5
D 206	D1-22 DO YOU DRAW VOLTAGE, CURRENT, OR IMPEDANCE VECTOR DIAGRAMS FOR CIRCUITS	7	7	11
D 207	D1-23 DO YOU CALCULATE TOTAL IMPEDANCE FOR CAPACITIVE CIRCUITS	11	11	11
D 208	D1-24 DO YOU CALCULATE PHASE ANGLES BETWEEN IMPEDANCE AND RESISTANCE IN CAPACITIVE CIRCUITS	6	5	8
D 209	D1-25 DO YOU CALCULATE TOTAL IMPEDANCE FOR SERIES RCL CIRCUITS	11	10	13
D 210	D1-26 DO YOU CALCULATE IMPEDANCE ANGLES FOR SERIES RCL CIRCUITS	4	4	5
D 211	D1-27 DO YOU CALCULATE APPARENT POWER (PA) FOR SERIES RCL CIRCUITS	6	6	5
D 212	D1-28 DO YOU CALCULATE TRUE POWER (PT) FOR SERIES RCL CIRCUITS	8	7	9
D 213	D1-29 DO YOU CALCULATE POWER FACTORS (PF) FOR SERIES RCL CIRCUITS	7	7	7
D 214	D1-30 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RCL CIRCUITS	11	11	8
D 215	D1-31 DO YOU CALCULATE IMPEDANCE ANGLES FOR PARALLEL RCL CIRCUITS	4	4	3
D 216	D1-32 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL CIRCUITS USING THE ASSUMED VOLTAGE METHOD	7	7	9
D 217	D1-33 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL CIRCUITS USING OHM'S LAW	11	10	14
D 218	D1-34 DO YOU CHECK CAPACITORS USING OHMMETERS	30	32	24
D 219	D1-35 DO YOU CHECK CAPACITORS USING SUBSTITUTION	22	24	14
D 220	D1-36 DO YOU CHECK INDUCTORS USING OHMMETERS	26	28	18
D 221	D1-37 DO YOU CHECK INDUCTORS USING SUBSTITUTION	16	19	8
D 222	D1-38 DO YOU USE OR REFER TO THE GENERAL RULE THAT THETA= 0, PF = 1, AND PA = PT FOR RESONANT CIRCUITS	3	3	1
D 223	D1-39 DO YOU CALCULATE RESONANT FREQUENCIES FOR RCL CIRCUITS	11	11	12
D 224	D1-40 DO YOU USE OR REFER TO THE GENERAL RULE THAT IMPEDANCE IS MINIMUM AND CURRENT MAXIMUM AT THE RESONANT FREQUENCY FOR SERIES RCL CIRCUITS	15	13	18
D 225	D1-41 DO YOU USE OR REFER TO THE GENERAL RULE THAT LINE CURRENT IS MINIMUM AND IMPEDANCE MAXIMUM AT RESONANT FREQUENCY FOR PARALLEL RCL CIRCUITS	14	13	17
D 226	D1-42 DO YOU USE OR REFER TO THE GENERAL RULE THAT HALF POWER POINTS ARE AT 70.7 PERCENT OF THE PEAK CURRENT VALUE	11	12	9
D 227	D1-43 DO YOU USE OR REFER TO THE GENERAL RULE THAT BANDWIDTH IS INVERSELY PROPORTIONAL TO Q	13	12	18
D 228	D1-44 DO YOU DETERMINE HOW CHANGES IN FREQUENCY, RESISTANCE, CAPACITANCE, OR INDUCTANCE WILL AFFECT CURRENT OR PHASE ANGLES FOR RCL CIRCUITS	9	9	11

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 076	SPC 077	SPC 078	
D	229	D2-01 IN YOUR PRESENT JOB, DO YOU WORK WITH, USE, OR REFER TO SERIES OR PARALLEL RESONANT CIRCUITS OR TIME CONSTANTS	25	26	24	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)
D	230	D2-02 DO YOU WORK WITH, USE, OR REFER TO TIME CONSTANTS	24	24	25	
D	231	D2-03 DO YOU WORK WITH, USE, OR REFER TO AVAILABLE VOLTAGE	14	14	12	
D	232	D2-04 DO YOU WORK WITH, USE, OR REFER TO TRANSIENT INTERVALS	11	12	7	
D	233	D2-05 DO YOU USE OR REFER TO THE GENERAL RULE THAT A CAPACITOR IS FULLY CHARGED (OR DISCHARGED) AFTER FIVE (5) TIME CONSTANTS (TC)	17	16	21	
D	234	D2-06 DO YOU USE OR REFER TO UNIVERSAL TIME CONSTANT CHARTS	7	8	4	
D	235	D2-07 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CIRCUIT CURRENT OR COMPONENT VOLTAGES AFTER A SPECIFIC TIME FOR RC OR LR CIRCUITS	11	10	12	
D	236	D2-08 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE THE TIME REQUIRED FOR CIRCUIT CURRENT OR COMPONENT VOLTAGES TO REACH SPECIFIC VALUES FOR RC OR LR CIRCUITS	11	11	12	
D	237	D2-09 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE COMPONENT VALUES REQUIRED FOR CIRCUIT CURRENT AND COMPONENT VOLTAGES TO REACH SPECIFIC VALUES IN SPECIFIC TIMES	11	11	11	
D	238	D2-10 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT IN LR CIRCUITS REACHES ITS MINIMUM VALUE (OR ZERO) AFTER FIVE (5) TIME CONSTANTS	10	9	14	
D	239	D3-01 DO YOU WORK WITH CIRCUITS USED AS FILTERS IN YOUR PRESENT JOB	49	50	46	
D	240	D3-02 DO YOU INSPECT FILTER CIRCUITS	36	39	22	FILTERS
D	241	D3-03 DO YOU CLEAN FILTER CIRCUITS	22	27	9	
D	242	D3-04 DO YOU ALIGN OR ADJUST FILTER CIRCUITS	30	35	13	
D	243	D3-05 DO YOU TROUBLESHOOT TO THE FILTER CIRCUIT LEVEL	33	38	20	
D	244	D3-06 DO YOU TROUBLESHOOT TO COMPONENT PARTS	31	34	21	
D	245	D3-07 DO YOU REMOVE OR REPLACE THE COMPLETE FILTER CIRCUIT	40	44	26	
D	246	D3-08 DO YOU REMOVE OR REPLACE FILTER CIRCUIT COMPONENT PARTS	31	34	18	
D	247	D3-09 DO YOU WORK WITH LOW PASS FILTERS	44	47	36	
D	248	D3-10 DO YOU WORK WITH HIGH PASS FILTERS	38	41	24	
D	249	D3-11 DO YOU WORK WITH BANDPASS FILTERS	42	46	29	
D	250	D3-12 DO YOU WORK WITH BAND-REJECT FILTERS	24	27	17	
D	251	D3-13 DON'T REMEMBER WHICH TYPE OF FILTER YOU WORK WITH	7	8	5	
D	252	D3-14 DO YOU WORK WITH L-SECTION FILTER CONFIGURATION	18	18	20	
D	253	D3-15 DO YOU WORK WITH T-SECTION FILTER CONFIGURATION	18	18	20	
D	254	D3-16 DO YOU WORK WITH PI-SECTION FILTER CONFIGURATION	14	13	17	
D	255	D3-17 DON'T REMEMBER WHICH TYPE FILTER CONFIGURATION	22	23	17	
D	256	D3-18 DO THE FILTERS YOU WORK WITH USE PARALLEL RESONANT CIRCUITS	21	21	20	
D	257	D3-19 DO THE FILTERS YOU WORK WITH USE SERIES-PARALLEL CIRCUITS	22	22	21	
D	258	D3-20 DO THE FILTERS YOU WORK WITH USE SERIES RESONANT CIRCUITS	21	21	21	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
D 259	03-21 DON'T REMEMBER WHICH TYPE OF BASIC CIRCUIT	20	23	11	
D 260	03-22 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CAPACITANCE OR INDUCTANCE VALUES REQUIRED FOR SPECIFIC FILTERS	8	9	5	
E 261	E1-01 DO YOU WORK WITH COUPLING DEVICES IN YOUR PRESENT JOB	32	33	29	
E 262	E1-02 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH RC COUPLING	26	24	28	COUPLING
E 263	E1-03 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH IMPEDANCE COUPLING	24	24	24	
E 264	E1-04 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH TRANSFORMER COUPLING	31	30	34	
E 265	E1-05 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM RC COUPLING	22	23	20	
E 266	E1-06 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM IMPEDANCE COUPLING	22	29	14	
E 267	E1-07 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM TRANSFORMER COUPLING	26	26	25	
E 268	E1-08 DO YOU WORK WITH DIRECTLY COUPLED CIRCUITS	28	28	29	
E 269	E1-09 DO YOU WORK WITH CAPACITIVE-RESISTIVE COUPLED CIRCUITS	26	26	25	
E 270	E1-10 DO YOU WORK WITH CAPACITIVE-INDUCTIVE COUPLED CIRCUITS	23	22	24	
E 271	E1-11 DO YOU WORK WITH TRANSFORMER COUPLED CIRCUITS	27	26	30	
E 272	E1-12 DON'T REMEMBER WHICH TYPE OF COUPLING CIRCUITS	7	7	7	
E 273	E2-01 IN YOUR PRESENT JOB, DO YOU PERFORM SOLDERING TECHNIQUES OR INSPECT OR EVALUATE SOLDERED CONNECTIONS	79	85	57	
E 274	E2-02 DO YOU SELECT TYPE OF SOLDER TO USE	62	66	47	SOLDERING
E 275	E2-03 DO YOU ADD FLUX TO CONNECTIONS	60	63	51	
E 276	E2-04 DO YOU CLEAN CONNECTIONS USING SOLVENTS	63	67	49	
E 277	E2-05 DO YOU STRIP INSULATION FROM WIRES	79	85	57	
E 278	E2-06 DO YOU CONNECT OR DISCONNECT HEAT SINKS	70	76	51	
E 279	E2-07 DO YOU BEND OR SHAPE WIRES OR LEADS	79	86	55	
E 280	E2-08 DO YOU CUT WIRES	80	87	58	
E 281	E2-09 DO YOU FILE OR SHAPE SOLDERING IRON TIPS	56	59	49	
E 282	E2-10 DO YOU TIN SOLDERING IRON TIPS	78	84	57	
E 283	E2-11 DO YOU CLEAN SOLDERING IRON TIPS	79	86	57	
E 284	E2-12 DO YOU CLEAN ELECTRICAL SURFACES USING ERASERS	69	67	55	
E 285	E2-13 DO YOU TIN OR PRE-TIN CONDUCTORS	76	82	55	
E 286	E2-14 DO YOU INSPECT SOLDERED CONNECTIONS	77	82	59	
E 287	E2-15 DO YOU DESOLDER CONNECTIONS BY WICKING	51	53	45	
E 288	E2-16 DO YOU DESOLDER CONNECTIONS USING VACUUM DESOLDERING TOOLS	69	75	47	
E 289	E2-17 DO YOU CUT COMPONENT LEADS TO REMOVE COMPONENTS	56	62	38	
E 290	E2-18 DO YOU CRUSH COMPONENTS FOR REMOVAL	14	14	13	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078	
E 291	E2-19	DO YOU MAKE HARDWIRE CONNECTIONS	76	82	57	
E 292	E2-20	DO YOU MAKE PRINTED CIRCUIT BOARD CONNECTIONS	67	79	45	
E 293	E2-21	DO YOU SOLDER PASSIVE COMPONENTS SUCH AS RESISTORS OR CAPACITORS ON PRINTED CIRCUIT BOARDS	68	76	43	
E 294	E2-22	DO YOU SOLDER ACTIVE COMPONENTS SUCH AS SOLID-STATE DIODES OR TRANSISTORS ON PRINTED CIRCUIT BOARDS	66	73	42	
E 295	E3-01	DO YOU WORK WITH RELAYS ON YOUR PRESENT JOB	57	61	45	
E 296	E3-02	DO YOU ADJUST RELAYS	14	15	12	
E 297	E3-03	DO YOU CLEAN RELAYS	30	34	18	RELAYS
E 298	E3-04	DO YOU INSPECT RELAYS	42	47	28	
E 299	E3-05	DO YOU REMOVE & REPLACE COMPLETE RELAYS	52	58	32	
E 300	E3-06	DO YOU REMOVE OR REPLACE PARTS OR RELAYS	8	9	5	
E 301	E3-07	DO YOU TROUBLESHOOT RELAYS	40	43	32	
E 302	E3-08	DO YOU STRAIGHTEN RELAY CONTACTS	24	26	13	
E 303	E3-09	DO YOU PERFORM TASKS ON RELAY CONTACTS	21	24	13	
E 304	E3-10	DO YOU PERFORM TASKS ON RELAY CORES	4	4	3	
E 305	E3-11	DO YOU PERFORM TASKS ON RELAY COILS	6	7	3	
E 306	E3-12	DO YOU PERFORM TASKS ON RELAY ARMATURES	9	10	5	
E 307	E3-13	DO YOU PERFORM TASKS ON RELAY SPRINGS	11	12	5	
E 308	E3-14	DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW (SPST), NORMALLY OPEN (NO) SCHEMATIC SYMBOLS FOR RELAYS	50	53	41	
E 309	E3-15	DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW (SPST), NORMALLY CLOSED (NC) SCHEMATIC SYMBOLS FOR RELAYS	50	52	42	
E 310	E3-16	DO YOU USE OR REFER TO SINGLE POLE, DOUBLE THROW (SPDT) SCHEMATIC SYMBOLS FOR RELAYS	48	51	41	
E 311	E3-17	DO YOU USE OR REFER TO DOUBLE POLE, DOUBLE THROW (DPDT) SCHEMATIC SYMBOLS FOR RELAYS	48	51	37	
E 312	E3-18	DO YOU USE OR REFER TO OTHER RELAY SYMBOLS SCHEMATIC SYMBOLS FOR RELAYS	42	44	37	
E 313	E3-19	DO YOU CHECK ELECTRICAL CONTINUITY OF COILS BY MEASURING RESISTANCE	40	44	28	
F 314	F1-01	IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH MICROPHONES	21	24	12	
F 315	F1-02	DO YOU INSPECT MICROPHONES	10	11	5	MICROPHONES
F 316	F1-03	DO YOU CLEAN MICROPHONES	8	9	5	
F 317	F1-04	DO YOU OPERATE MICROPHONES	22	25	14	
F 318	F1-05	DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OR MICROPHONES	13	15	5	
F 319	F1-06	DO YOU TROUBLESHOOT DOWN TO MICROPHONE PARTS	5	4	5	
F 320	F1-07	DO YOU REMOVE OR REPLACE COMPLETE MICROPHONES	12	14	5	
F 321	F1-08	DO YOU REMOVE OR REPLACE MICROPHONE PARTS	5	5	4	
F 322	F1-09	DO YOU PERFORM TASKS ON CARBON MICROPHONES	8	9	5	
F 323	F1-10	DO YOU PERFORM TASKS ON CAPACITOR MICROPHONES	3	3	3	
F 324	F1-11	DO YOU PERFORM TASKS ON CRYSTAL MICROPHONES	4	4	3	
F 325	F1-12	DO YOU PERFORM TASKS ON DYNAMIC MICROPHONES	7	8	5	
F 326	F1-13	DO YOU PERFORM TASKS ON VELOCITY RIBBON MICROPHONES	2	2	1	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			BY-TSK	SPC 076	SPC 077	SPC 079	
F	327	F2-01	IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH SPEAKERS	21	24	13	SPEAKERS
F	328	F2-02	DO YOU INSPECT SPEAKERS	15	18	4	
F	329	F2-03	DO YOU CLEAN SPEAKERS	10	13	3	
F	330	F2-04	DO YOU OPERATE SPEAKERS	19	22	12	
F	331	F2-05	DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OF SPEAKERS	15	18	5	
F	332	F2-06	DO YOU TROUBLESHOOT DOWN TO SPEAKER PARTS	4	6	3	
F	333	F2-07	DO YOU REMOVE OR REPLACE COMPLETE SPEAKERS	16	20	5	
F	334	F2-08	DO YOU REMOVE OR REPLACE SPEAKER PARTS	3	3	1	
F	335	F2-09	DO YOU PERFORM ANY TASKS ON SPEAKER CONES	2	2	1	
F	336	F2-10	DO YOU PERFORM ANY TASKS ON SPEAKER SPIDERS	1	1	0	
F	337	F2-11	DO YOU PERFORM ANY TASKS ON SPEAKER FIELD COILS	2	3	1	
F	338	F2-12	DO YOU PERFORM ANY TASKS ON SPEAKER VOICE COILS	2	2	1	
F	339	F2-13	DO YOU PERFORM ANY TASKS ON SPEAKER PERMANENT MAGNETS	2	2	1	
F	340	F2-14	DO YOU PERFORM ANY TASKS ON SPEAKER ELECTROMAGNETS	2	3	1	
F	341	F2-15	DO YOU PERFORM ANY TASKS ON SPEAKER SOFT IRON CORES	2	2	1	
F	342	F3-01	DO YOU USE OSCILLOSCOPES IN YOUR PRESENT JOB	83	82	84	
F	343	F3-02	DO YOU USE OSCILLOSCOPES TO PERFORM OPERATIONAL CHECKS	81	80	82	OSCILLOSCOPES
F	344	F3-03	DO YOU USE OSCILLOSCOPES TO PERFORM ALIGNMENTS OR ADJUSTMENTS	75	73	83	
F	345	F3-04	DO YOU USE OSCILLOSCOPES TO TROUBLESHOOT ELECTRONIC CIRCUITS	69	71	61	
F	346	F3-05	DO YOU USE OSCILLOSCOPES TO MEASURE FREQUENCY	75	72	84	
F	347	F3-06	DO YOU USE OSCILLOSCOPES TO MEASURE TIME	64	60	75	
F	348	F3-07	DO YOU USE OSCILLOSCOPES TO OBSERVE LISAJOUS PATTERNS	20	18	26	
F	349	F3-08	DO YOU USE OSCILLOSCOPES TO OBSERVE SIGNALS WHILE UTILIZING ATTENUATOR PROBES	63	64	61	
F	350	F3-09	DO YOU USE OSCILLOSCOPES TO MAKE FREQUENCY OR TIME MEASUREMENTS USING DELAY TIME MULTIPLIERS	45	42	55	
F	351	F3-10	DO YOU USE OSCILLOSCOPES TO MEASURE AC VOLTAGE	75	74	71	
F	352	F3-11	DO YOU USE OSCILLOSCOPES TO MEASURE OR OBSERVE SIGNALS AFTER FIRST ADJUSTING THE GAIN AND DC BAL CONTROLS	66	67	64	
F	353	F3-12	DO YOU USE OSCILLOSCOPES TO MEASURE DC VOLTAGE	79	80	79	
G	354	G1-01	DO YOU WORK WITH SEMICONDUCTOR DIODES IN YOUR PRESENT JOB	60	63	49	
G	355	G1-02	DO YOU INSPECT DIODES	52	58	36	SEMICONDUCTOR DIODES
G	356	G1-03	DO YOU REMOVE OR REPLACE DIODES	66	61	39	
G	357	G1-04	DO YOU CHECK DIODES USING AN INSTRUMENT	54	59	39	
G	358	G1-05	DO YOU USE ENERGY LEVEL DIAGRAMS IN YOUR WORK WITH DIODES	7	8	3	
G	359	G1-06	DO YOU USE PN JUNCTION DIODE CHARACTERISTIC CURVES, TOGETHER WITH VALUES OF FORWARD AND REVERSE BIAS VOLTAGE, TO COMPUTE FORWARD OR REVERSE BIAS RESISTANCE	8	9	5	
G	360	G1-07	DO YOU COMPUTE FORWARD OR REVERSE BIAS RESISTANCE FOR DIODES	11	10	13	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078
G 361	G1-08	DO YOU USE OR REFER TO THE GENERAL RULE THAT TEMPERATURE CAN AFFECT THE OPERATION OF DIODES	39	40	33
G 362	G1-09	DO YOU IDENTIFY SEMICONDUCTOR DIODES AS OPPOSED TO OTHER ELECTRONIC COMPONENTS, SUCH AS RESISTORS, BASED ON THEIR PHYSICAL APPEARANCE	53	56	41
G 363	G1-10	DO YOU REFER TO OR DO YOU DETERMINE THE GENERAL EFFECTS OF DOPING ON CURRENT FLOW	9	10	7
G 364	G1-11	DO YOU USE OR REFER TO MEASUREMENTS OF FORWARD BIAS RESISTANCE	37	40	30
G 365	G1-12	DO YOU USE OR REFER TO DIODE COLOR CODING	24	29	16
G 366	G1-13	DO YOU USE OR REFER TO CENTRIFUGAL FORCE OF AN ELECTRON IN ORBIT AROUND A NUCLEUS	2	1	4
G 367	G1-14	DO YOU USE OR REFER TO CENTRIPETAL FORCE OF AN ELECTRON IN ORBIT AROUND A NUCLEUS	2	2	4
G 368	G1-15	DO YOU USE OR REFER TO DIODE NUMBERING SYSTEM, SUCH AS IN 538	47	53	29
G 369	G1-16	DO YOU USE OR REFER TO KINETIC ENERGY OF AN ELECTRON MOVING IN ORBIT	3	2	5
G 370	G1-17	DO YOU USE OR REFER TO POTENTIAL ENERGY OF AN ELECTRON MOVING IN ORBIT	3	2	5
G 371	G1-18	DO YOU USE OR REFER TO MEASUREMENTS OF REVERSE BIAS RESISTANCE	36	38	32
G 372	G1-19	DO YOU USE OR REFER TO NUMBER OF ELECTRONS IN A PARTICULAR SHELL OR ORBIT	3	2	5
G 373	G1-20	DO YOU USE OR REFER TO PERMISSIBLE ENERGY LEVELS OF AN ORBITING ELECTRON	3	2	5
G 374	G1-21	DO YOU USE OR REFER TO FORBIDDEN ENERGY LEVELS OF AN ORBITING ELECTRON	3	2	4
G 375	G1-22	DO YOU USE OR REFER TO VALENCE ELECTRONS (THOSE IN THE OUTERMOST SHELL)	4	2	8
G 376	G1-23	DO YOU USE OR REFER TO ATOMIC NUMBER (TOTAL NUMBER OF ELECTRONS IN ATOM)	3	2	4
G 377	G1-24	DO YOU USE OR REFER TO SYMBOLS ON THE DIODE WHICH INDICATE THE CATHODE END	55	58	45
G 378	G1-25	DO YOU NEED TO KNOW WHICH MATERIALS ARE USED IN THE CONSTRUCTION OF DIODES SUCH AS GERMANIUM OR SILICON	23	24	21
G 379	G1-26	DO YOU NEED TO KNOW THAT SEMICONDUCTORS HAVE NEGATIVE TEMPERATURE COEFFICIENTS OF RESISTANCE (AS TEMPERATURE INCREASES RESISTANCE DECREASES)	26	25	28
G 380	G1-27	DO YOU USE OR REFER TO PN JUNCTION DIODE CHARACTERISTIC CURVES, SUCH AS VOLTAGE - CURRENT CHARACTERISTIC CURVES (PERHAPS YOU DO THIS TO IDENTIFY POINTS OF STRUCTURAL BREAKDOWN OR OPERATING REGIONS)	19	21	13
G 381	G1-28	DO YOU DETERMINE WHETHER PN JUNCTION DIODES ARE FORWARD BIASED OR REVERSE BIASED WHEN YOU READ OR INTERPRET CIRCUIT DIAGRAMS	42	42	39
G 382	G1-29	DO YOU USE OR REFER TO VALENCE BAND IN SEMICONDUCTOR MATERIALS	3	3	4

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	CY-TSK	SPC 076	SPC 077	SPC 078	
G 383	61-30 DO YOU USE OR REFER TO FORBIDDEN BAND IN SEMICONDUCTOR MATERIALS	3	2	4	
G 384	61-31 DO YOU USE OR REFER TO CONDUCTION BAND IN SEMICONDUCTOR MATERIALS	3	3	4	
G 385	61-32 DO YOU USE OR REFER TO COVALENT BONDING IN SEMICONDUCTOR MATERIALS	3	3	4	
G 386	61-33 DO YOU USE OR REFER TO ELECTRON-HOLE PAIR CREATED IN SEMICONDUCTORS	6	4	11	
G 387	61-34 DO YOU USE OR REFER TO ELECTRON FLOW OR HOLE FLOW IN SEMICONDUCTORS	13	11	21	
G 388	61-35 DO YOU USE OR REFER TO DONOR IMPURITY IN SEMICONDUCTORS	7	6	13	
G 389	61-36 DO YOU USE OR REFER TO ACCEPTOR IMPURITY IN SEMICONDUCTORS	7	6	13	
G 390	61-37 DO YOU USE OR REFER TO P-TYPE SEMICONDUCTOR MATERIAL	20	20	22	
G 391	61-38 DO YOU USE OR REFER TO N-TYPE SEMICONDUCTOR MATERIAL	21	20	22	
G 392	61-39 DO YOU USE OR REFER TO MAJORITY CARRIERS IN SEMICONDUCTORS	7	5	12	
G 393	61-40 DO YOU USE OR REFER TO MINORITY CARRIERS IN SEMICONDUCTORS	7	6	12	
G 394	61-41 DO YOU USE OR REFER TO JUNCTION RECOMBINATION IN SEMICONDUCTORS	6	5	11	
G 395	61-42 DO YOU USE OR REFER TO DEPLETION REGION IN SEMICONDUCTORS	11	10	14	
G 396	61-43 DO YOU USE OR REFER TO RELATIONSHIP BETWEEN BARRIER WIDTH AND DIFFERENCE OF POTENTIAL	7	6	12	
G 397	61-44 DO YOU USE OR REFER TO THE 10:1 BACK TO FRONT RESISTANCE RATIO FOR DIODES	26	25	28	
G 398	61-45 DO YOU USE OR REFER TO BARRIER HEIGHT IN SEMICONDUCTORS	2	2	4	
G 399	61-46 DO YOU USE OR REFER TO DIODE SUBSTITUTION INFORMATION	32	38	13	
G 400	61-47 DO YOU USE OR REFER TO MAXIMUM AVERAGE FORWARD CURRENT DIODE RATINGS	27	31	14	
G 401	61-48 DO YOU USE OR REFER TO PEAK RECURRENT FORWARD CURRENT DIODE RATINGS	20	22	12	
G 402	61-49 DO YOU USE OR REFER TO MAXIMUM SURGE CURRENT DIODE RATINGS	25	28	16	
G 403	61-50 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE DIODE RATINGS	29	33	16	
G 404	62-01 DO YOU WORK WITH TRANSISTORS IN YOUR PRESENT JOB.	63	67	50	TRANSISTORS
G 405	62-02 DO YOU INSPECT TRANSISTORS	55	62	33	
G 406	62-03 DO YOU REMOVE OR REPLACE TRANSISTORS	58	66	33	
G 407	62-04 DO YOU CHECK TRANSISTORS USING AN INSTRUMENT	56	61	39	
G 408	62-05 DO YOU USE OR REFER TO EMITTER - BASE (EB) FORWARD AND REVERSE RESISTANCE MEASUREMENTS	52	55	42	
G 409	62-06 DO YOU USE OR REFER TO COLLECTOR - BASE (CB) FORWARD AND REVERSE RESISTANCE MEASUREMENTS	50	53	41	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			SPC 076	SPC 077	SPC 078	
		BY-TSK				
G	410	G2-07 DO YOU USE OR REFER TO EMITTER - COLLECTOR (EC) RESISTANCE MEASUREMENTS	51	54	42	
G	411	G2-08 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE PHYSICAL BARRIER WIDTH OF THE EMITTER - BASE JUNCTION	21	20	26	
G	412	G2-09 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE PHYSICAL BARRIER WIDTH OF THE COLLECTOR - BASE JUNCTION	21	20	25	
G	413	G2-10 DO YOU USE OR REFER TO THE PHYSICAL SIZE OF THE TRANSISTOR STRUCTURE (COLLECTOR, BASE AND EMITTER)	35	38	24	
G	414	G2-11 DO YOU USE OR REFER TO LEAKAGE CURRENT (ICBO) IN A TRANSISTOR	25	25	25	
G	415	G2-12 DO YOU USE OR REFER TO TRANSISTOR SCHEMATIC SYMBOLS	61	64	50	
G	416	G2-13 DO YOU USE OR REFER TO TRANSISTOR NOTATION SUCH AS Q1, Q2, Q3, ETC	61	64	51	
G	417	G2-14 DO YOU USE OR REFER TO TRANSISTOR SUBSTITUTION INFORMATION	46	51	32	
G	418	G2-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE TRANSISTOR BASE CURRENT IB IS NORMALLY SIGNIFICANTLY SMALLER THAN THE EMITTER CURRENT IE (USUALLY IB BEING 2 TO 8 PERCENT OF IE)	26	25	29	
G	419	G2-16 DO YOU USE THE INFORMATION THAT THE EFFECT OF EMITTER BASE VOLTAGE ON BASE CURRENT IS THE CONTROLLING FACTOR FOR TRANSISTORS	40	41	34	
G	420	G2-17 DO YOU USE THE GENERAL RULE THAT LEAKAGE CURRENT (ICBO) IN A TRANSISTOR INCREASES AS TEMPERATURE INCREASES	20	21	18	
G	421	G2-18 DO YOU USE OR REFER TO TRANSISTOR CHARACTERISTIC CURVES	26	29	19	
G	422	G2-19 DO YOU USE OR REFER TO BETA TRANSISTOR GAINS	22	22	21	
G	423	G2-20 DO YOU USE OR REFER TO ALPHA TRANSISTOR GAINS	13	14	12	
G	424	G2-21 DO YOU USE OR REFER TO GAMMA TRANSISTOR GAINS	11	11	11	
G	425	G2-22 DO YOU CALCULATE BETA TRANSISTOR GAINS	11	12	7	
G	426	G2-23 DO YOU CALCULATE ALPHA TRANSISTOR GAINS	7	8	3	
G	427	G2-24 DO YOU CALCULATE GAMMA TRANSISTOR GAINS	5	5	3	
G	428	G3-01 DO YOU WORK WITH TRANSISTOR AMPLIFIERS IN YOUR PRESENT JOB	45	48	37	
G	429	G3-02 DO YOU INSPECT TRANSISTOR AMPLIFIERS	39	44	22	TRANSISTOR AMPLIFIERS
G	430	G3-03 DO YOU ALIGN OR ADJUST TRANSISTOR AMPLIFIERS	32	36	20	
G	431	G3-04 DO YOU TROUBLESHOOT TO THE AMPLIFIER CIRCUIT LEVEL	38	42	24	
G	432	G3-05 DO YOU TROUBLESHOOT TO AMPLIFIER COMPONENTS	36	40	21	
G	433	G3-06 DO YOU REMOVE OR REPLACE THE COMPLETE AMPLIFIER	37	42	20	
G	434	G3-07 DO YOU REMOVE OR REPLACE AMPLIFIER COMPONENTS	34	40	17	
G	435	G3-08 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR CURRENT WHICH RESULTS FROM A CHANGE IN BASE CURRENT	22	22	22	
G	436	G3-09 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN COLLECTOR CURRENT WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	10	12	5	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078
G 437	G3-10 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A CHANGE IN BASE CURRENT	21	21	21
G 438	G3-11 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	10	11	7
G 439	G3-12 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN BASE CURRENT WHICH RESULTS FROM AN INPUT SIGNAL	21	20	21
G 440	G3-13 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN BASE CURRENT WHICH RESULTS FROM A SPECIFIC INPUT SIGNAL	12	13	7
G 441	G3-14 DO YOU USE THE LOAD-LINE METHOD OF ANALYSIS IN YOUR CIRCUIT ANALYSIS (THIS METHOD REQUIRES YOU TO PLOT A LOAD-LINE ON A TRANSISTOR CHARACTERISTIC CURVE)	4	4	4
G 442	G3-15 DO YOU USE OR REFER TO THE OPERATING POINT @ (QUIESCENT POINT) FOR A TRANSISTOR	13	12	16
G 443	G3-16 DO YOU CALCULATE THE SPECIFIC QUIESCENT POINT FOR A PARTICULAR TRANSISTOR	3	4	3
G 444	G3-17 DO YOU MEASURE VOLTAGE GAIN USED IN THE COMMON EMITTER CONFIGURATION	31	33	28
G 445	G3-18 DO YOU MEASURE CURRENT GAIN USED IN THE COMMON EMITTER CONFIGURATION	24	24	22
G 446	G3-19 DO YOU MEASURE POWER GAIN USED IN THE COMMON EMITTER CONFIGURATION	21	22	20
G 447	G3-20 DO YOU CALCULATE THE VOLTAGE GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE-EMITTER VOLTAGE INTO THE CHANGE THE BASE COLLECTOR VOLTAGE TO DETERMINE THE VOLTAGE GAIN	8	10	4
G 448	G3-21 DO YOU CALCULATE THE CURRENT GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE CURRENT INTO THE CHANGE IN COLLECTOR CURRENT TO DETERMINE THE CURRENT GAIN	9	10	4
G 449	G3-22 DO YOU CALCULATE THE POWER GAIN FOR A SPECIFIC TRANSISTOR USING A FORMULA THAT IS, DO YOU MULTIPLY THE CURRENT GAIN TIMES THE VOLTAGE GAIN TO DETERMINE THE POWER GAIN	6	6	4
G 450	G3-23 DO YOU NEED TO KNOW THAT MORE COLLECTOR CURRENT IS GENERATED WITH LESS COLLECTOR VOLTAGE AS TEMPERATURE INCREASES (THIS AFFECTS THE STATIC OPERATING POINT [Q] OF THE TRANSISTOR)	7	8	7
G 451	G3-24 DO YOU COMPUTE THE STATIC OPERATING POINT [Q] OF A TRANSISTOR AT DIFFERENT TEMPERATURES	3	3	3
G 452	G3-25 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH [illegible]ER (SWAMPING) RESISTOR STABILIZATION	17	16	21
G 453	G3-[illegible] DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH SELF-BIAS STABILIZATION	17	16	18

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078
G 454	63-27 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH THERMISTOR STABILIZATION	15	14	16
G 455	63-28 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH FORWARD BIAS DIODE STABILIZATION	17	17	14
G 456	63-29 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH REVERSE BIAS DIODE STABILIZATION	17	17	14
G 457	63-30 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH DOUBLE DIODE STABILIZATION	12	12	12
G 458	63-31 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM EMITTER (SWAMPING) RESISTOR STABILIZATION	16	17	13
G 459	63-32 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM SELF-BIAS STABILIZATION	17	19	11
G 460	63-33 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM THERMISTOR STABILIZATION	13	15	8
G 461	63-34 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM FORWARD BIAS DIODE STABILIZATION	16	18	9
G 462	63-35 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM REVERSE BIAS DIODE STABILIZATION	16	18	9
G 463	63-36 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM DOUBLE DIODE STABILIZATION	14	15	9
G 464	63-37 DO YOU IDENTIFY AMPLITUDE DISTORTION FOR TRANSISTOR CIRCUITS	26	30	19
G 465	63-38 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF AMPLITUDE DISTORTION	25	29	11
G 466	63-39 DO YOU IDENTIFY FREQUENCY DISTORTION FOR TRANSISTOR CIRCUITS	25	29	13
G 467	63-40 DO YOU IDENTIFY PHASE DISTORTION FOR TRANSISTOR CIRCUITS	19	22	8
G 468	63-41 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF PHASE DISTORTION	17	20	8
G 469	63-42 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF FREQUENCY DISTORTION	21	24	9
G 470	63-43 DO YOU NEED TO KNOW THE DEGENERATIVE EFFECTS ON THE CIRCUIT CAUSED BY CHANGING EMITTER RESISTANCE FOR TRANSISTOR AMPLIFIERS IN THE COMMON COLLECTOR CONFIGURATION	13	14	12
G 471	63-44 DO YOU DETERMINE THE CLASS OF OPERATION FOR AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	17	16	18
G 472	63-45 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	7	8	5
G 473	63-46 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	31	33	25
G 474	63-47 DO YOU TROUBLESHOOT OR REPAIR COMPLEMENTARY SYMMETRY CIRCUITS	17	18	13
G 475	63-48 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	15	17	11

PCT MBRS RESPONDING 'YES' BY SELECTED GRPS

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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 076	SPC 077	SPC 078	
G 476 GJ-49	DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	23	23	41	
H 477 H1-01	DO YOU USE OR REFER TO VARACTORS	14	14	13	
H 478 H1-02	DO YOU USE OR REFER TO TUNNEL DIODES	23	21	26	SOLID-STATE
H 479 H1-03	DO YOU USE OR REFER TO FIELD EFFECT TRANSISTORS (FET)	40	41	34	SPECIAL PURPOSE
H 480 H1-04	DO YOU USE OR REFER TO UNIJUNCTION TRANSISTORS	26	27	24	DEVICES
H 481 H1-05	DO YOU USE OR REFER TO ZENER DIODES	62	66	49	
H 482 H1-06	DO YOU USE OR REFER TO INTEGRATED CIRCUITS	64	71	45	
H 483 H2-01	IN YOUR PRESENT JOB; DO YOU WORK WITH POWER SUPPLIES	76	76	74	
H 484 H2-02	DO YOU INSPECT POWER SUPPLIES	57	60	47	
H 485 H2-03	DO YOU CLEAN POWER SUPPLIES	42	44	33	
H 486 H2-04	DO YOU ALIGN OR ADJUST POWER SUPPLIES	60	62	53	POWER SUPPLIES
H 487 H2-05	DO YOU TROUBLESHOOT TO POWER SUPPLY CIRCUIT LEVEL	50	53	41	
H 488 H2-06	DO YOU TROUBLESHOOT TO POWER SUPPLY COMPONENTS	42	45	33	
H 489 H2-07	DO YOU REMOVE OR REPLACE COMPLETE POWER SUPPLIES	61	65	49	
H 490 H2-08	DO YOU REMOVE OR REPLACE POWER SUPPLY COMPONENTS	42	47	28	
H 491 H2-09	DO YOU WORK WITH HALF-WAVE RECTIFIERS	38	41	28	
H 492 H2-10	DO YOU WORK WITH FULL-WAVE RECTIFIERS OTHER THAN BRIDGE RECTIFIERS	40	43	29	
H 493 H2-11	DO YOU WORK WITH BRIDGE RECTIFIERS	45	49	32	
H 494 H2-12	DO YOU WORK WITH THREE-PHASE RECTIFIERS	14	16	9	
H 495 H2-13	DO YOU USE OR REFER TO INPUT VOLTAGE	51	52	46	
H 496 H2-14	DO YOU USE OR REFER TO INPUT FREQUENCY	39	40	34	
H 497 H2-15	DO YOU USE OR REFER TO PEAK OUTPUT VOLTAGE	46	49	39	
H 498 H2-16	DO YOU USE OR REFER TO AVERAGE OUTPUT VOLTAGE	41	42	36	
H 499 H2-17	DO YOU USE OR REFER TO RIPPLE AMPLITUDE	34	36	24	
H 500 H2-18	DO YOU USE OR REFER TO RIPPLE FREQUENCY	26	26	24	
H 501 H2-19	DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE	22	23	17	
H 502 H2-20	DO YOU USE OR REFER TO SHAPE OF OUTPUT WAVEFORMS	45	47	42	
H 503 H2-21	DO YOU USE OR REFER TO EFFECTIVE OUTPUT VOLTAGE	45	48	38	
H 504 H2-22	DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE FILTERS	41	44	29	
H 505 H2-23	DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE FILTERS	31	34	21	
H 506 H2-24	DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE INPUT L-TYPE FILTERS	28	29	24	
H 507 H2-25	DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE INPUT L-TYPE FILTERS	24	26	17	
H 508 H2-26	DO YOU WORK WITH CIRCUITS WHICH EMPLOY LC PI-TYPE FILTERS	21	22	18	
H 509 H2-27	DO YOU WORK WITH CIRCUITS WHICH EMPLOY RC PI-TYPE FILTERS	24	24	24	
H 510 H2-28	DO YOU WORK WITH CIRCUITS WHICH EMPLOY DON'T REMEMBER WHICH TYPE OF FILTER	22	23	17	
H 511 H2-29	DO YOU HAVE THE OPTION OF REPLACING ONE TYPE OF FILTER WITH A DIFFERENT TYPE FILTER	7	8	3	
H 512 H3-01	DO YOU WORK WITH OSCILLATORS IN YOUR PRESENT JOB	50	52	43	OSCILLATORS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			SPC 076	SPC 077	SPC 078	
		BY-TSK				
H	513	H3-02 DO YOU INSPECT OSCILLATORS	36	40	22	
H	514	H3-03 DO YOU ALIGN OR ADJUST OSCILLATORS	39	43	28	
H	515	H3-04 DO YOU REMOVE OR REPLACE COMPLETE OSCILLATORS	37	41	22	
H	516	H3-05 DO YOU REMOVE OR REPLACE OSCILLATOR COMPONENTS	24	27	13	
H	517	H3-06 DO YOU TROUBLESHOOT TO OSCILLATOR CIRCUIT LEVEL	31	33	24	
H	518	H3-07 DO YOU TROUBLESHOOT TO OSCILLATOR COMPONENTS	26	29	17	
H	519	H3-08 DO YOU USE OR REFER TO FEEDBACK	31	32	30	
H	520	H3-09 DO YOU USE OR REFER TO FREQUENCY DETERMINING DEVICES (FDD)	32	31	36	
H	521	H3-10 DO YOU USE OR REFER TO AMPLITUDE STABILITY	29	30	26	
H	522	H3-11 DO YOU USE OR REFER TO FREQUENCY STABILITY	39	40	37	
H	523	H3-12 DO YOU USE OR REFER TO DAMPING	18	18	18	
H	524	H3-13 DO YOU USE OR REFER TO REGENERATIVE FEEDBACK	31	30	33	
H	525	H3-14 DO YOU USE OR REFER TO PIEZOELECTRIC EFFECT	22	21	28	
H	526	H3-15 DO YOU USE OR REFER TO CRITICAL DAMPING	7	8	7	
H	527	H3-16 DO YOU USE OR REFER TO UNDER DAMPING	8	8	9	
H	528	H3-17 DO YOU USE OR REFER TO OVER DAMPING	8	7	9	
H	529	H3-18 DO YOU WORK WITH OSCILLATORS WHICH USE LC TANK CIRCUITS AS FDD	22	21	24	
H	530	H3-19 DO YOU WORK WITH OSCILLATORS WHICH USE RC NETWORKS AS FDD	27	27	29	
H	531	H3-20 DO YOU WORK WITH OSCILLATORS WHICH USE CRYSTALS AS FDD	33	33	30	
H	532	H3-21 DO YOU WORK WITH OSCILLATORS WHICH USE DON'T REMEMBER WHICH TYPE OF FDD	12	13	9	
H	533	H3-22 DO YOU WORK WITH SERIES HARTLEY SINUSOIDAL OSCILLATORS	16	12	26	
H	534	H3-23 DO YOU WORK WITH SHUNT HARTLEY SINUSOIDAL OSCILLATORS	14	11	24	
H	535	H3-24 DO YOU WORK WITH COLPITTS SINUSOIDAL OSCILLATORS	19	16	26	
H	536	H3-25 DO YOU WORK WITH CLAPP SINUSOIDAL OSCILLATORS	5	4	8	
H	537	H3-26 DO YOU WORK WITH BUTLER SINUSOIDAL OSCILLATORS	4	4	5	
H	538	H3-27 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE O. OSCILLATORS	20	22	11	
I	539	I1-01 DO YOU WORK WITH MULTIVIBRATORS IN YOUR PRESENT JOB	29	28	32	
I	540	I1-02 DO YOU INSPECT WAVE GENERATING OR SHAPING CIRCUITS	23	26	16	
I	541	I1-03 DO YOU ALIGN OR ADJUST WAVE GENERATING OR SHAPING CIRCUITS	22	23	17	MULTIVIBRATORS
I	542	I1-04 DO YOU CALIBRATE WAVE GENERATING OR SHAPING CIRCUITS	18	19	14	
I	543	I1-05 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUITS	23	25	16	
I	544	I1-06 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUIT COMPONENTS	20	21	14	
I	545	I1-07 DO YOU REMOVE OR REPLACE COMPLETE WAVE GENERATING OR SHAPING CIRCUITS	21	23	12	
I	546	I1-08 DO YOU REMOVE OR REPLACE WAVE GENERATING OR SHAPING COMPONENTS	19	22	11	
I	547	I1-09 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN LC TANK CIRCUITS	15	15	17	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			SPC 076	SPC 077	SPC 078	
		BY-TSK				
I	548	11-10 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN RC NETWORKS	23	20	30	
I	549	11-11 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN CRYSTALS	19	18	24	
I	550	11-12 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN DON'T REMEMBER WHICH TYPE OF FDD	6	8	0	
I	551	11-13 DO YOU WORK WITH ASTABLE MULTIVIBRATORS	26	24	30	
I	552	11-14 DO YOU WORK WITH MONOSTABLE MULTIVIBRATORS	27	25	32	
I	553	11-15 DO YOU WORK WITH BISTABLE MULTIVIBRATORS	26	25	32	
I	554	11-16 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE MULTIVIBRATORS	4	5	0	
I	555	12-01 DO YOU WORK WITH LIMITERS OR CLAMPERS IN YOUR PRESENT JOB	26	27	24	
I	556	12-02 DO YOU WORK WITH SERIES DIODE LIMITERS	18	20	13	LIMITERS AND CLAMPERS
I	557	12-03 DO YOU WORK WITH SHUNT DIODE LIMITERS	16	15	18	
I	558	12-04 DO YOU WORK WITH LIMITERS WITH BIAS	14	14	16	
I	559	12-05 DO YOU WORK WITH ZENER DIODE LIMITERS	20	20	20	
I	560	12-06 DO YOU WORK WITH TRANSISTOR LIMITERS	16	17	13	
I	561	12-07 DO YOU WORK WITH DON'T KNOW WHICH TYPE OF LIMITERS	7	7	5	
I	562	12-08 DO YOU WORK WITH BASIC DIODE CLAMPING CIRCUITS	17	16	21	
I	563	12-09 DO YOU WORK WITH DIODE CLAMPING CIRCUITS WITH BIAS	13	12	18	
I	564	12-10 DO YOU WORK WITH DON'T KNOW WHICH TYPE OF CLAMPING CIRCUIT	6	7	4	
I	565	13-01 IN YOUR PRESENT JOB, DO YOU WORK ON EQUIPMENT WHICH CONTAINS ELECTRON TUBES	23	22	26	
I	566	13-02 DO YOU CHECK ELECTRON TUBES TO SEE IF THEY ARE GOOD	21	20	22	ELECTRON TUBES
I	567	13-03 DO YOU USE TUBE TESTERS TO CHECK ELECTRON TUBES	19	18	24	
I	568	13-04 DO YOU USE MULTIMETERS TO CHECK ELECTRON TUBES	10	8	16	
I	569	13-05 DO YOU USE SCOPES TO CHECK ELECTRON TUBES	10	9	13	
I	570	13-06 DO YOU USE SUBSTITUTION TO CHECK ELECTRON TUBES	15	16	13	
I	571	13-07 DO YOU USE OR REFER TO CUTOFF	10	7	18	
I	572	13-08 DO YOU USE OR REFER TO PEAK INVERSE VOLTAGE RATING	6	6	8	
I	573	13-09 DO YOU USE OR REFER TO PEAK CURRENT RATING	7	8	7	
I	574	13-10 DO YOU USE OR REFER TO TRANSIT TIME	7	4	17	
I	575	13-11 DO YOU USE OR REFER TO PLATE DISSIPATION RATING	5	5	4	
I	576	13-12 DO YOU USE OR REFER TO SATURATION	12	9	20	
I	577	13-13 DO YOU USE OR REFER TO DC PLATE RESISTANCE	8	7	12	
I	578	13-14 DO YOU COMPUTE ACTUAL VALUES OF THE DC PLATE RESISTANCE FOR ELECTRON TUBES	2	2	4	
I	579	13-15 DO YOU USE OR REFER TO PLATE VOLTAGE	16	14	24	
I	580	13-16 DO YOU USE OR REFER TO PLATE CURRENT	15	12	22	
I	581	13-17 DO YOU USE OR REFER TO GRID VOLTAGE	16	14	24	
I	582	13-18 DO YOU USE OR REFER TO GRID CURRENT	14	12	22	
I	583	13-19 DO YOU USE OR REFER TO CATHODE VOLTAGE	16	14	24	
I	584	13-20 DO YOU USE OR REFER TO CATHODE CURRENT	15	12	22	
I	585	13-21 DO YOU USE OR REFER TO THE TRIODE AMPLIFICATION FACTOR (THE AMPLIFICATION FACTOR FOR TRIODES IS DEFINED AS THE RATIO OF CHANGE IN PLATE VOLTAGE TO A CHANGE IN GRID VOLTAGE)	6	4	12	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 076	SPC 077	SPC 078	
I 584	J3-22 DO YOU CALCULATE ACTUAL VALUES OF TRIODE AMPLIFICATION FACTORS	2	2	3	
I 587	J3-23 DO YOU USE OR REFER TO MULTIGRID (TETRODE, PENTODE, ETC) AMPLIFICATION FACTORS	7	5	13	
I 588	J3-24 DO YOU USE OR REFER TO ELECTRON TUBE TRANSCONDUCTANCE (G, WHICH IS MEASURED IN MHOS)	6	4	11	
I 589	J3-25 DO YOU CALCULATE ACTUAL VALUES OF ELECTRON TUBE TRANSCONDUCTANCES	2	2	1	
I 590	J3-26 DO YOU USE OR REFER TO THE ELECTRON TUBE PARAMETER CALLED AC PLATE RESISTANCE	3	2	5	
I 591	J3-27 DO YOU CALCULATE ACTUAL VALUES OF AC PLATE RESISTANCE	2	2	1	
I 592	J3-28 DO YOU USE OR REFER TO ELECTRON TUBE INTERELECTRODE CAPACITANCE	7	4	16	
I 593	J3-29 DO YOU USE OR REFER TO CHARACTERISTIC CURVES IN YOUR WORK WITH ELECTRON TUBES	7	6	11	
I 594	J3-30 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE VOLTAGE FOR A SPECIFIED BIAS	5	4	7	
I 595	J3-31 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE CURRENT FOR A SPECIFIED BIAS	6	5	8	
I 596	J3-32 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR CUTOFF	6	5	9	
I 597	J3-33 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR SATURATION	6	5	9	
I 598	J3-34 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER GAIN	14	12	20	
I 599	J3-35 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER EFFICIENCY	9	7	14	
I 600	J3-36 DO YOU USE TEST TUBE CHECKERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	11	10	14	
I 601	J3-37 DO YOU USE MULTIMETERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	8	7	13	
I 602	J3-38 DO YOU USE OSCILLOSCOPES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	8	8	9	
I 603	J3-39 DO YOU USE CHARACTERISTIC CURVES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	5	6	1	
I 604	J3-40 DO YOU CALCULATE ANY ELECTRON TUBE CAPACITANCES SUCH AS INPUT CAPACITANCE	1	1	0	
I 605	J3-41 DO YOU USE OR REFER TO TUBE SOCKET NOTATION	15	16	14	
I 606	J3-42 DO YOU USE OR REFER TO PIN NUMBERING SYSTEMS	17	17	17	
I 607	J3-43 DO YOU USE OR REFER TO THE TYPE OF MATERIAL OR THE OPERATING TEMPERATURE OF THE EMITTING SURFACE IN THE ELECTRON TUBES YOU WORK ON	2	2	1	
I 608	J3-44 DO YOU USE OR REFER TO TUBE SUBSTITUTION MATERIAL SUCH AS MANUALS OR CHARTS	11	12	8	
J 609	J1-01 DO YOU WORK WITH ELECTRON TUBE AMPLIFIERS OR CIRCUITS IN YOUR PRESENT JOB	13	12	18	ELECTRON TUBE AMPLIFIERS AND CIRCUITS
J 610	J1-02 DO YOU DETERMINE THE CLASS OF OPERATION FOR ELECTRON TUBE AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	6	4	9	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
J 611	J1-03 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	2	1	4	
J 612	J1-04 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	9	9	12	
J 613	J1-05 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	3	2	5	
J 614	J1-06 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	7	4	14	
J 615	J1-07 DO YOU TROUBLESHOOT OR REPAIR DON'T KNOW WHICH TYPE OF AMPLIFIER	4	4	3	
J 616	J2-01 DO YOU WORK WITH GAS TUBES (HOT CATHODE OR COLD CATHODE)	10	7	20	SPECIAL PURPOSE ELECTRON TUBES
J 617	J2-02 DO YOU WORK WITH CATHODE-RAY TUBES	21	20	28	
J 618	J2-03 DO YOU USE OR REFER TO THE CHARACTERISTICS OF BEAM POWER TUBES	5	2	14	
J 619	J2-04 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH BEAM POWER TUBES ARE USED	4	2	8	
J 620	J2-05 DO YOU USE OR REFER TO THE CHARACTERISTICS OF THYRATRONS	6	2	16	
J 621	J2-06 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH THYRATRONS ARE USED	3	2	7	
J 622	J2-07 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTRON GUNS OF CATHODE-RAY TUBES (CRT)	14	11	25	
J 623	J2-08 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROMAGNETIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	13	11	18	
J 624	J2-09 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROSTATIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	12	10	21	
J 625	J2-10 DO YOU USE OR REFER TO PHOSPHOR SCREENS	19	16	29	
J 626	J2-11 DO YOU USE OR REFER TO AQUADAG COATINGS	8	6	16	
J 627	J2-12 DO YOU USE OR REFER TO ELECTRON OPTICS	8	7	13	
J 628	J2-13 DO YOU USE OR REFER TO PERSISTENCE	8	7	14	
J 629	J2-14 DO YOU USE OR REFER TO DECAY TIMES	9	7	13	
J 630	J2-15 DO YOU USE OR REFER TO FLUORESCENCE	9	7	16	
J 631	J2-16 DO YOU USE OR REFER TO PHOSPHORESCENCE	12	11	16	
J 632	J3-01 DO YOU WORK ON TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	36	35	41	
J 633	J3-02 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	25	24	28	HETERODYNING, MODULATION, AND DEMODULATION
J 634	J3-03 DO YOU PERFORM TASKS ON FREQUENCY MIXERS	25	24	29	
J 635	J3-04 DO YOU USE OR REFER TO THE HETERODYNING OF SIGNALS IN YOUR WORK WITH TRANSMIT OR RECEIVE SYSTEMS	25	24	30	
J 636	J3-05 DO YOU PERFORM TASKS ON REACTANCE MODULATORS	13	11	18	
J 637	J3-06 DO YOU PERFORM TASKS ON MODULATED OSCILLATORS	19	18	21	
K 638	K1-01 DO YOU WORK ON AM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	10	9	13	
K 639	K1-02 DO YOU INSPECT AM TRANSMIT OR RECEIVE SYSTEMS	7	8	7	AM SYSTEMS
K 640	K1-03 DO YOU CLEAN AM TRANSMIT OR RECEIVE SYSTEMS	7	7	7	
K 641	K1-04 DO YOU ALIGN OR ADJUST AM TRANSMIT OR RECEIVE SYSTEMS	9	9	11	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			SPC 076	SPC 077	SPC 078	
		DY-TSK				
A	642	K1-05 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE SYSTEMS	9	9	9	
K	643	K1-06 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE COMPONENTS	8	8	8	
K	644	K1-07 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE SYSTEMS	9	9	9	
K	645	K1-08 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE COMPONENTS	8	8	7	
K	646	K1-09 DO YOU PERFORM TASKS ON RF OSCILLATORS	7	7	9	
K	647	K1-10 DO YOU PERFORM TASKS ON RF AMPLIFIERS	8	8	9	
K	648	K1-11 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	8	8	8	
K	649	K1-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	7	7	5	
K	650	K1-13 DO YOU PERFORM TASKS ON LOCAL OSCILLATORS	8	7	11	
K	651	K1-14 DO YOU PERFORM TASKS ON IF AMPLIFIERS	7	7	8	
K	652	K1-15 DO YOU PERFORM TASKS ON DETECTORS	8	7	11	
K	653	K1-16 DO YOU PERFORM TASKS ON DON'T REMEMBER WHICH AM STAGE	2	1	3	
K	654	K1-17 DO YOU USE OR REFER TO AMPLITUDE STABILIZATION IN TRANSMITTERS	4	4	1	
K	655	K1-18 DO YOU USE OR REFER TO FREQUENCY STABILIZATION IN TRANSMITTERS	6	6	4	
K	656	K1-19 DO YOU USE OR REFER TO SENSITIVITY OF RECEIVERS	8	8	9	
K	657	K1-20 DO YOU USE OR REFER TO SELECTIVITY OF RECEIVERS	8	7	9	
K	658	K1-21 DO YOU USE OR REFER TO 2ND HARMONIC DISTORTION	5	6	3	
K	659	K1-22 DO YOU USE OR REFER TO BANDPASS DISTORTION	6	7	3	
K	660	K1-23 DO YOU USE OR REFER TO SQUARE LAW DISTORTION	2	2	1	
K	661	K1-24 DO YOU USE OR REFER TO CO-CHANNEL INTERFERENCE	4	4	4	
K	662	K1-25 DO YOU USE OR REFER TO IMAGE FREQUENCIES IN RECEIVERS	4	4	4	
K	663	K1-26 DO YOU USE OR REFER TO SIGNAL TO IMAGE RATIOS OR IMAGE REJECTION RATIOS	3	3	4	
K	664	K1-27 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM TRANSMITTER SCHEMATIC DIAGRAMS	3	4	3	
K	665	K1-28 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM RECEIVER SCHEMATIC DIAGRAMS	8	8	7	
K	666	K2-01 DO YOU WORK WITH FM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	33	31	39	
K	667	K2-02 DO YOU INSPECT FM TRANSMIT OR RECEIVE SYSTEMS	28	28	28	FM SYSTEMS
K	668	K2-03 DO YOU CLEAN FM TRANSMIT OR RECEIVE SYSTEMS	23	24	18	
K	669	K2-04 DO YOU ALIGN FM TRANSMIT OR RECEIVE SYSTEMS	28	27	30	
K	670	K2-05 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE SYSTEMS	25	25	24	
K	671	K2-06 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE COMPONENTS	23	24	21	
K	672	K2-07 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE SYSTEMS	24	26	17	
K	673	K2-08 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE COMPONENTS	21	23	14	
K	674	K2-09 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	19	20	16	
K	675	K2-10 DO YOU PERFORM TASKS ON FREQUENCY MULTIPLIERS	20	20	18	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
K 676	K2-11 DO YOU PERFORM TASKS ON DRIVERS (INTERMEDIATE AMPLIFIERS)	17	18	16	
K 677	K2-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	19	19	18	
K 678	K2-13 DO YOU PERFORM TASKS ON RF AMPLIFIERS	21	21	18	
K 679	K2-14 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	19	20	17	
K 680	K2-15 DO YOU PERFORM TASKS ON IF AMPLIFIERS	20	20	18	
K 681	K2-16 DO YOU PERFORM TASKS ON LIMITERS	18	18	18	
K 682	K2-17 DO YOU PERFORM TASKS ON FREQUENCY DISCRIMINATORS	24	24	22	
K 683	K2-18 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM TRANSMITTERS	18	16	24	
K 684	K2-19 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM RECEIVERS	26	24	30	
K 685	K3-01 DO YOU CONVERT DECIMAL (BASE 10) NUMBERS TO OCTAL (BASE 8) NUMBERS	31	30	33	
K 686	K3-02 DO YOU CONVERT DECIMAL NUMBERS TO BINARY (BASE 2) NUMBERS	36	36	37	NUMBERING SYSTEMS
K 687	K3-03 DO YOU CONVERT OCTAL NUMBERS TO DECIMAL NUMBERS	31	31	29	
K 688	K3-04 DO YOU CONVERT OCTAL NUMBERS TO BINARY NUMBERS	27	27	29	
K 689	K3-05 DO YOU CONVERT BINARY NUMBERS TO DECIMAL NUMBERS	37	38	34	
K 690	K3-06 DO YOU CONVERT BINARY NUMBERS TO OCTAL NUMBERS	28	28	29	
K 691	K3-07 DO YOU ADD BINARY NUMBERS TO GET A SUM	26	26	28	
K 692	K3-08 DO YOU SUBTRACT BINARY NUMBERS USING THE END-AROUND-CARRY METHOD	17	16	24	
K 693	K3-09 DO YOU SUBTRACT BINARY NUMBERS USING THE DIRECT SUBTRACTION METHOD	20	18	26	
K 694	K3-10 DO YOU ADD OCTAL NUMBERS TO GET A SUM	19	17	25	
L 695	L1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO LOGIC FUNCTIONS	31	32	26	
L 696	L1-02 DO YOU CONSTRUCT TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	19	18	22	LOGIC FUNCTIONS
L 697	L1-03 DO YOU CONSTRUCT TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	19	18	22	
L 698	L1-04 DO YOU CONSTRUCT TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	19	18	22	
L 699	L1-05 DO YOU CONSTRUCT TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS OR GATES	19	18	22	
L 700	L1-06 DO YOU USE OR REFER TO TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	24	24	24	
L 701	L1-07 DO YOU USE OR REFER TO TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	24	24	24	
L 702	L1-08 DO YOU USE OR REFER TO TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	23	24	21	
L 703	L1-09 DO YOU USE OR REFER TO TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS	23	23	25	
L 704	L1-10 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR AND GATES	29	29	28	
L 705	L1-11 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR OR GATES	29	30	28	
L 706	L1-12 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR NAND OR NOR GATES	30	30	28	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
L 707	L1-13 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR EXCLUSIVE OR GATES	28	28	26	
L 708	L2-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO BOOLEAN EQUATIONS, LOGIC DIAGRAMS, OR LOGIC CIRCUITS	21	21	24	BOOLEAN EQUATIONS
L 709	L2-02 DO YOU DRAW LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUITS	7	5	11	
L 710	L2-03 DO YOU CONSTRUCT TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	4	2	8	
L 711	L2-04 DO YOU DRAW LOGIC DIAGRAMS FROM GIVEN BOOLEAN EQUATIONS	10	6	24	
L 712	L2-05 DO YOU MEASURE INPUTS OR OUTPUTS OF LOGIC GATES	17	19	13	
L 713	L2-06 DO YOU DEVELOP OR ANALYZE BOOLEAN EQUATIONS IN THE PROCESS OF TROUBLESHOOTING DIGITAL CIRCUITS	9	9	9	
L 714	L2-07 DO YOU ANALYZE LOGIC CIRCUITS BY USING BOOLEAN ALGEBRA	12	10	20	
L 715	L2-08 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUIT GATES	7	7	8	
L 716	L2-09 DO YOU USE OR REFER TO TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	3	3	5	
L 717	L2-10 DO YOU USE OR REFER TO LOGIC DIAGRAMS CONSISTING OF MORE THAN ONE GATE	20	19	25	
L 718	L2-11 DO YOU COMPUTE SUM AND CARRY EXPRESSIONS FOR SERIAL HALF OR FULL ADDER LOGIC DIAGRAMS	9	6	21	
L 719	L2-12 DO YOU TRACE DATA FLOW THROUGH PARALLEL FULL ADDER LOGIC DIAGRAMS	12	8	22	
L 720	L2-13 DO YOU WORK WITH ASTABLE (FREE RUNNING) MULTIVIBRATORS	18	16	24	
L 721	L2-14 DO YOU WORK WITH BISTABLE (FLIP-FLOP) MULTIVIBRATORS	20	19	24	
L 722	L2-15 DO YOU WORK WITH MONOSTABLE (ONE-SHOT) MULTIVIBRATORS	21	19	25	
L 723	L2-16 DO YOU USE OR REFER TO FLIP-FLOP MULTIVIBRATOR SYMBOLS	18	17	24	
L 724	L2-17 DO YOU USE OR REFER TO SINGLE-SHOT MULTIVIBRATOR SYMBOLS	18	17	22	
L 725	L2-18 DO YOU USE OR REFER TO FLIP-FLOP CIRCUIT DIAGRAMS	19	18	24	
L 726	L2-19 DO YOU USE OR REFER TO FLIP-FLOP TRUTH TABLES	15	14	16	
L 727	L2-20 DO YOU USE OR REFER TO COMPLEMENTED FLIP-FLOP LOGIC SYMBOLS	16	13	24	
L 728	L2-21 DO YOU USE OR REFER TO COMPLEMENTING FLIP-FLOP LOGIC SYMBOLS	15	13	22	
L 729	L2-22 DO YOU MEASURE OUTPUT WAVESHAPES OF LOGIC CIRCUITS	17	18	12	
L 730	L2-23 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTED FLIP-FLOP SCHEMATIC DIAGRAMS	15	13	21	
L 731	L2-24 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTING FLIP-FLOP SCHEMATIC DIAGRAMS	15	13	20	
L 732	L2-25 DO YOU CONSTRUCT TRUTH TABLES FOR J-K FLIP-FLOP LOGIC SYMBOLS	9	9	11	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
L 733	L3-01 DO YOU WORK WITH DIGITAL COUNTERS IN YOUR PRESENT JOB	41	43	36	
L 734	L3-02 DO YOU USE OR REFER TO UP-COUNTERS	29	29	29	COUNTERS
L 735	L3-03 DO YOU USE OR REFER TO DOWN-COUNTERS	26	27	24	
L 736	L3-04 DO YOU USE OR REFER TO SERIAL COUNTERS	28	29	28	
L 737	L3-05 DO YOU USE OR REFER TO PARALLEL COUNTERS	24	25	22	
L 738	L3-06 DO YOU USE OR REFER TO RING COUNTERS	15	13	21	
L 739	L3-07 DO YOU USE OR REFER TO DECADE COUNTERS	24	23	28	
L 740	L3-08 DO YOU USE OR REFER TO COUNT DETECT CIRCUITS	19	22	11	
L 741	L3-09 DO YOU USE OR REFER TO DOWN CLOCKS	19	21	11	
L 742	L3-10 DO YOU USE OR REFER TO UP CLOCKS	21	24	14	
L 743	L3-11 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	18	18	20	
L 744	L3-12 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	16	16	17	
L 745	L3-13 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF DECADE COUNTERS	19	18	22	
L 746	L3-14 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF RING COUNTERS	14	12	20	
L 747	L3-15 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTER	18	17	21	
L 748	L3-16 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	22	22	25	
L 749	L3-17 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF COUNTERS	21	21	22	
L 750	L3-18 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	14	12	20	
L 751	L3-19 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	13	12	17	
L 752	L3-20 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTERS	12	11	17	
L 753	L3-21 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR OTHER TYPES OF COUNTERS	14	13	17	
L 754	L3-22 DO YOU CONSTRUCT TRUTH TABLES FROM LOGIC DIAGRAMS OF DECADE COUNTERS	7	8	5	
L 755	L3-23 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP IN RING COUNTERS FOR SPECIFIC INPUT PULSES	13	11	20	
L 756	L3-24 DO YOU DETERMINE THE APPROPRIATE AND GATE NECESSARY IN COUNT DETECT CIRCUITS TO INDICATE A REQUIRED COUNT	14	13	14	
M 757	M1-01 DO YOU WORK WITH SAWTOOTH WAVE GENERATORS	31	29	36	
M 758	M1-02 DO YOU WORK WITH TRAPEZOIDAL WAVE GENERATORS	11	12	7	
M 759	M1-03 DO YOU WORK WITH PULSED OSCILLATORS WITH REGENERATIVE FEEDBACK	17	16	20	TIMING CIRCUITS
M 760	M1-04 DO YOU WORK WITH PULSED OSCILLATORS WITHOUT REGENERATIVE FEEDBACK	14	13	14	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 076	SPC 077	SPC 078	
M 761	M1-05 DO YOU WORK WITH BLOCKING OSCILLATORS	14	11	21	
M 762	M1-06 DO YOU USE OR REFER TO RISE TIME	93	93	93	
M 763	M1-07 DO YOU USE OR REFER TO FALL OR FLYBACK TIME	36	34	42	
M 764	M1-08 DO YOU USE OR REFER TO SWEEP TIME	93	92	97	
M 765	M1-09 DO YOU USE OR REFER TO ELECTRICAL LENGTH OF SAWTOOTH WAVEFORMS	17	15	22	
M 766	M1-10 DO YOU USE OR REFER TO PHYSICAL LENGTH OF SAWTOOTH WAVEFORMS	17	15	22	
M 767	M1-11 DO YOU USE OR REFER TO LINEAR SLOPE OF SAWTOOTH WAVEFORMS	20	17	29	
M 768	M1-12 DO YOU USE OR REFER TO GATE LENGTH OF SAWTOOTH WAVEFORMS	12	12	14	
M 769	M2-01 DO YOU USE SIGNAL GENERATORS IN YOUR PRESENT JOB	66	62	78	
M 770	M2-02 DO YOU PERFORM OPERATIONAL CHECKS WHILE USING SIGNAL GENERATORS	58	54	67	USE OF SIGNAL GENERATORS
M 771	M2-03 DO YOU PERFORM PERIODIC MAINTENANCE SUCH AS ADJUSTING, ALIGNING, OR CALIBRATING WHILE USING SIGNAL GENERATORS	35	34	38	
M 772	M2-04 DO YOU TROUBLESHOOT TO AN ASSEMBLY OR SUBASSEMBLY WHILE USING SIGNAL GENERATORS	31	31	32	
M 773	M2-05 DO YOU TROUBLESHOOT TO THE SMALLEST REPLACEABLE COMPONENT WHILL USING SIGNAL GENERATORS	22	22	20	
M 774	M2-06 DO YOU USE AUDIO SINE-WAVE GENERATORS	46	45	50	
M 775	M2-07 DO YOU USE AUDIO NON-SINUSOIDAL WAVE GENERATORS SUCH AS SQUARE WAVE, TRIANGLE, PULSE, OR SPIKE	41	42	30	
M 776	M2-08 DO YOU USE RF GENERATORS LESS THAN 1,000 MH	43	39	55	
M 777	M2-09 DO YOU USE RF GENERATORS GREATER THAN 1,000 MH	36	31	55	
M 778	M2-10 DO YOU USE OTHER SPECIAL PURPOSE OR MULTI-FUNCTION GENERATORS	45	46	42	
M 779	M3-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH ALTERNATING CURRENT OR DIRECT CURRENT MOTORS OR GENERATORS	25	29	9	MOTORS AND GENERATORS
M 780	M3-02 DO YOU INSPECT MOTORS	21	25	6	
M 781	M3-03 DO YOU CLEAN OR LUBRICATE MOTORS	20	24	8	
M 782	M3-04 DO YOU OPERATE MOTORS	23	28	8	
M 783	M3-05 DO YOU REMOVE OR REPLACE COMPLETE MOTORS	21	26	7	
M 784	M3-06 DO YOU REMOVE OR REPLACE MOTOR PARTS	11	13	4	
M 785	M3-07 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS OF MOTORS	21	25	8	
M 786	M3-08 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF MOTORS	10	13	0	
M 787	M3-09 DO YOU PERFORM ANY TASKS ON FIELD COILS	7	9	0	
M 788	M3-10 DO YOU PERFORM ANY TASKS ON ARMATURES	7	9	1	
M 789	M3-11 DO YOU PERFORM ANY TASKS ON ROTORS	8	10	1	
M 790	M3-12 DO YOU PERFORM ANY TASKS ON BRUSHES	11	13	4	
M 791	M3-13 DO YOU PERFORM ANY TASKS ON SLIP RINGS	8	10	1	
M 792	M3-14 DO YOU PERFORM ANY TASKS ON COMMUTATORS	7	9	1	
M 793	M3-15 DO YOU PERFORM ANY TASKS ON POLE PIECES	5	7	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 074	SPC 077	SPC 078	
M 794	MJ-16 DO YOU DETERMINE OR MEASURE THE MAGNITUDE OF THE FORCE OR TORQUE CREATED BY A MOTOR	3	4	0	
M 795	MJ-17 DO YOU DETERMINE OR MEASURE THE DIRECTION OF THE MECHANICAL FORCE OR TORQUE CREATED BY A MOTOR	4	6	0	
M 796	MJ-18 DO YOU DETERMINE OR MEASURE THE MAGNITUDE OR DIRECTION OF THE INDUCED VOLTAGE IN MOTORS	3	4	0	
M 797	MJ-19 DO YOU WORK WITH SYNCHRONOUS MOTORS	13	15	7	
M 798	MJ-20 DO YOU WORK WITH INDUCTION MOTORS	12	14	5	
M 799	MJ-21 DO YOU WORK WITH SPLIT-PHASE MOTORS	6	7	4	
M 800	MJ-22 DO YOU WORK WITH SOME COMBINATION OF THE ABOVE MOTORS	14	16	8	
M 801	MJ-23 DO YOU INSPECT GENERATORS	9	9	9	
M 802	MJ-24 DO YOU CLEAN OR LUBRICATE GENERATORS	7	7	8	
M 803	MJ-25 DO YOU OPERATE GENERATORS	12	13	8	
M 804	MJ-26 DO YOU REMOVE OR REPLACE COMPLETE GENERATORS	7	9	3	
M 805	MJ-27 DO YOU REMOVE OR REPLACE GENERATOR PARTS	3	4	3	
M 806	MJ-28 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS OF GENERATORS	7	8	4	
M 807	MJ-29 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF GENERATORS	3	3	3	
N 808	N1-01 DO YOU WORK WITH METERS IN Y[illegible] PRESENT JOB	78	79	75	
N 809	N1-02 DO YOU CONCEPTUALIZE OR CON[illegible] THE FUNCTIONS OF PERMANENT MAGNETS	22	20	29	METER MOVEMENTS
N 810	N1-03 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF MOVING COILS	27	25	34	
N 811	N1-04 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF SPIRAL SPRINGS	16	15	18	
N 812	N1-05 DO YOU READ METER SCALES	80	81	76	
N 813	N1-06 DO YOU EXTEND THE RANGE OF AMMETERS	31	32	26	
N 814	N1-07 DO YOU ZERO OHMMETERS	79	80	76	
N 815	N1-08 DO YOU ZERO AMMETERS	41	41	41	
N 816	N1-09 DO YOU EXTEND THE RANGE OF VOLTMETERS	38	40	34	
N 817	N1-10 DO YOU USE OR REFER TO VOLTMETER SENSITIVITY (EXPRESSED IN UNITS OF OHMS PER VOLT)	35	32	43	
N 818	N2-01 DO YOU WORK WITH SATURABLE REACTORS OR MAGNETIC AMPLIFIERS IN YOUR PRESENT JOB	2	1	7	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS
N 819	N2-02 DO YOU INSPECT MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	1	0	4	
N 820	N2-03 DO YOU CLEAN MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	1	0	1	
N 821	N2-04 DO YOU ADJUST MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	1	0	1	
N 822	N2-05 DO YOU TROUBLESHOOT MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	1	0	3	
N 823	N2-06 DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	1	1	3	
N 824	N2-07 DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIER OR SATURABLE REACTOR COMPONENTS	1	1	1	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078	
N	825	N2-08 DO YOU USE OR REFER TO HYSTERESIS CURVES OR LOOPS	1	0	5	
N	826	N2-09 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE REACTORS	1	0	4	
N	827	N2-10 DO YOU MEASURE OUTPUT WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE REACTORS	1	0	3	
N	828	N2-11 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT WAVEFORMS FOR MAGNETIC AMPLIFIERS	1	0	5	
N	829	N2-12 DO YOU USE OR REFER TO COERCIVE FORCE IN SATURABLE REACTORS	2	0	5	
N	830	N2-13 DO YOU USE OR REFER TO RESIDUAL MAGNETISM IN SATURABLE REACTORS	2	1	7	
N	831	N2-14 DO YOU USE OR REFER TO FLUX DENSITY IN SATURABLE REACTORS	2	1	7	
N	832	N2-15 DO YOU USE OR REFER TO POINT OF SATURATION IN SATURABLE REACTORS	2	1	7	
N	833	N2-16 DO YOU USE OR REFER TO SATURABLE REACTOR SCHEMATIC SYMBOLS	2	1	5	
N	834	N3-01 DO YOU WORK WITH WAVESHAPING CIRCUITS IN YOUR PRESENT JOB	32	30	38	
N	835	N3-02 DO YOU USE OR REFER TO TRANSIENT INTERVALS	15	13	18	WAVESHAPING CIRCUITS
N	836	N3-03 DO YOU USE OR REFER TO PULSE WIDTH (PW)	27	24	36	
N	837	N3-04 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)	19	18	24	
N	838	N3-05 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY (PRF)	19	18	22	
N	839	N3-06 DO YOU USE OR REFER TO DIFFERENTIATING CIRCUITS	22	21	26	
N	840	N3-07 DO YOU USE OR REFER TO INTEGRATING CIRCUITS	26	26	26	
N	841	N3-08 DO YOU USE OR REFER TO THE CLASSIFICATION OF TIME CONSTANTS (TC) AS LONG, MEDIUM, OR SHORT	18	17	22	
N	842	N3-09 DO YOU DETERMINE WHETHER AN LR OR RC CIRCUIT IS DIFFERENTIATING OR INTEGRATING BASED ON THE TIME CONSTANT AND OUTPUT CONFIGURATION	11	9	16	
N	843	N3-10 DO YOU WORK WITH SQUARE WAVE GENERATORS	27	27	29	
N	844	N3-11 DO YOU WORK WITH RECTANGULAR WAVE GENERATORS	16	15	20	
O	845	O1-01 DO YOU WORK ON SINGLE SIDEBAND SYSTEMS IN YOUR PRESENT JOB	2	3	1	
O	846	O1-02 DO YOU INSPECT SSB TRANSMIT OR RECEIVE SYSTEMS	2	2	1	
O	847	O1-03 DO YOU CLEAN SSB TRANSMIT OR RECEIVE SYSTEMS	1	2	0	SINGLE SIDEBAND SYSTEMS
O	848	O1-04 DO YOU ALIGN SSB TRANSMIT OR RECEIVE SYSTEMS	2	2	0	
O	849	O1-05 DO YOU TROUBLESHOOT TO SSB TRANSMIT OR RECEIVE SYSTEMS	1	2	0	
O	850	O1-06 DO YOU TROUBLESHOOT TO SSB TRANSMIT OR RECEIVE COMPONENTS	1	1	0	
O	851	O1-07 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE SYSTEMS	1	1	0	
O	852	O1-08 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE COMPONENTS	1	2	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
0 853	01-09 DO YOU PERFORM TASKS ON SSB AUDIO AMPLIFIERS	2	2	1	
0 854	01-10 DO YOU PERFORM TASKS ON SSB BALANCED MODULATORS	2	2	1	
0 855	01-11 DO YOU PERFORM TASKS ON SSB CARRIER OSCILLATORS	2	2	3	
0 856	01-12 DO YOU PERFORM TASKS ON SSB LC FILTERS	2	1	3	
0 857	01-13 DO YOU PERFORM TASKS ON SSB CRYSTAL FILTERS	2	2	3	
0 858	01-14 DO YOU PERFORM TASKS ON SSB MECHANICAL FILTERS	2	2	1	
0 859	01-15 DO YOU PERFORM TASKS ON SSB OSCILLATORS	2	2	3	
0 860	01-16 DO YOU PERFORM TASKS ON SSB MIXERS	2	2	3	
0 861	01-17 DO YOU PERFORM TASKS ON SSB DRIVERS	1	1	3	
0 862	01-18 DO YOU PERFORM TASKS ON SSB POWER AMPLIFIERS	2	2	3	
0 863	01-19 DO YOU PERFORM TASKS ON SSB RF AMPLIFIERS	2	1	3	
0 864	01-20 DO YOU PERFORM TASKS ON SSB FREQUENCY CONVERTERS	2	2	3	
0 865	01-21 DO YOU PERFORM TASKS ON SSB IF AMPLIFIERS	2	2	3	
0 866	01-22 DO YOU PERFORM TASKS ON SSB DEMODULATORS	2	2	3	
0 867	01-23 DO YOU PERFORM TASKS ON SSB DON'T REMEMBER WHICH SSB SYSTEM STAGES	1	1	1	
0 868	01-24 DO YOU USE OR REFER TO SELECTIVE FADING	1	0	1	
0 869	01-25 DO YOU USE OR REFER TO PEAK POWER	2	1	3	
0 870	01-26 DO YOU USE OR REFER TO FREQUENCY STABILITY	2	2	3	
0 871	01-27 DO YOU USE OR REFER TO RESPONSE CURVES FOR BANDWIDTH FILTERS	2	1	3	
0 872	01-28 DO YOU CALCULATE PEAK POWER OR EFFECTIVE POWER OF SSB TRANSMITTERS	1	1	3	
0 873	01-29 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB TRANSMITTER SCHEMATIC DIAGRAMS	2	2	3	
0 874	01-30 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB RECEIVER SCHEMATIC DIAGRAMS	2	2	3	
0 875	02-01 DO YOU WORK ON PULSE MODULATION SYSTEMS IN YOUR PRESENT JOB	23	20	33	
0 876	02-02 DO YOU INSPECT PULSE MODULATION SYSTEMS	18	18	20	PULSE MODULATION SYSTEMS
0 877	02-03 DO YOU CLEAN PULSE MODULATION SYSTEMS	15	16	14	
0 878	02-04 DO YOU ALIGN PULSE MODULATION SYSTEMS	18	18	20	
0 879	02-05 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEMS	17	17	17	
0 880	02-06 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEM COMPONENTS	16	16	16	
0 881	02-07 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEMS	14	14	14	
0 882	02-08 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEM COMPONENTS	14	16	11	
0 883	02-09 DO YOU WORK ON PULSE-AMPLITUDE MODULATION (PAM) SYSTEMS	13	10	25	
0 884	02-10 DO YOU WORK ON PULSE-DURATION MODULATION (PDM) SYSTEMS	11	7	24	
0 885	02-11 DO YOU WORK ON PULSE-POSITION MODULATION (PPM) SYSTEMS	2	2	3	
0 886	02-12 DO YOU WORK ON PULSE-CODE MODULATION (PCM) SYSTEMS	20	17	29	
0 887	02-13 DO YOU WORK ON LINE PULSING MODULATION SYSTEMS	2	2	0	
0 888	02-14 DO YOU WORK ON DON'T REMEMBER WHICH TYPE OF MODULATION SYSTEM	2	3	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 076	SPC 077	SPC 078
O	889	02-15 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM POWER SUPPLIES	15	16	11
O	890	02-16 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM CHARGING CHOKES AND CHARGING DIODES	4	4	3
O	891	02-17 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM PULSE FORMING NETWORKS	9	9	9
O	892	02-18 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM TIMERS	10	10	9
O	893	02-19 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM SWITCHES SUCH AS GAS THYRATRONS	1	1	3
O	894	02-20 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM PULSE TRANSFORMERS	4	3	7
O	895	02-21 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM TRANSMITTER TUBES	1	0	4
O	896	02-22 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM RF AMPLIFIERS	9	8	12
O	897	02-23 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM FREQUENCY CONVERTERS	12	12	13
O	898	02-24 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM IF AMPLIFIERS	10	10	11
O	899	02-25 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM DETECTORS	12	12	11
O	900	02-26 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM VIDEO AMPLIFIERS	10	9	13
O	901	02-27 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM POWER VIDEO AMPLIFIERS	6	5	9
O	902	02-28 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM CON'T REMEMBER WHICH PULSE MODULATION SYSTEM STAGES	3	3	3
O	903	02-29 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY (PRF)	10	9	13
O	904	02-30 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)	10	9	16
O	905	02-31 DO YOU USE OR REFER TO PULSE WIDTH (PW)	18	15	29
O	906	02-32 DO YOU USE OR REFER TO PULSE SHAPE	17	13	26
O	907	02-33 DO YOU USE OR REFER TO PEAK POWER	7	7	9
O	908	02-34 DO YOU USE OR REFER TO AVERAGE POWER	7	7	9
O	909	02-35 DO YOU CALCULATE PULSE RECURRENCE TIME (PRT) OR PULSE RECURRENCE FREQUENCY (PRF)	4	4	5
O	910	02-36 DO YOU MEASURE PULSE RECURRENCE TIME (PRT) OR PULSE RECURRENCE FREQUENCY (PRF)	7	6	9
O	911	02-37 DO YOU USE FORMULAS TO CALCULATE AVERAGE POWER OR PEAK POWER OF PULSE MODULATION TRANSMIT SYSTEMS	2	2	5
O	912	02-38 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE MODULATION TRANSMITTER SCHEMATIC DIAGRAMS	7	5	12
O	913	02-39 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE MODULATION RECEIVER SCHEMATIC DIAGRAMS	13	12	16
O	914	03-01 DO YOU WORK WITH ANTENNAS IN YOUR PRESENT JOB	28	24	39
O	915	03-02 DO YOU INSPECT ANTENNAS	22	21	24

ANTENNAS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 076	SPC 077	SPC 078
0 916	03-03 DO YOU CLEAN ANTENNAS	18	19	14
0 917	03-04 DO YOU PHYSICALLY ALIGN ANTENNAS	13	14	11
0 918	03-05 DO YOU ELECTRICALLY ALIGN ANTENNAS	11	12	8
0 919	03-06 DO YOU TROUBLESHOOT TO ANTENNAS	16	18	11
0 920	03-07 DO YOU TROUBLESHOOT TO ANTENNA COMPONENTS	12	13	5
0 921	03-08 DO YOU REMOVE OR INSTALL ANTENNAS	19	18	21
0 922	03-09 DO YOU REMOVE OR REPLACE COMPONENTS OF ANTENNAS	13	13	11
0 923	03-10 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING REPRESENTATIONS OF E OR ELECTRIC FIELD LINES	8	7	12
0 924	03-11 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING REPRESENTATIONS OF H OR MAGNETIC FIELD LINES	8	7	12
0 925	03-12 DO YOU DETERMINE THE DIRECTION OF THE MAGNETIC LINES IN RELATION TO THE ELECTRIC LINES OF FORCE FOR ANTENNAS	7	5	12
0 926	03-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE OF CORRECT LENGTH (HALF-WAVE) ACT AS INDUCTIVE LOADS TO THE GENERATOR	6	4	12
0 927	03-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE LONGER THAN A HALF-WAVE ACT AS INDUCTIVE LOADS TO THE GENERATOR	6	4	13
0 928	03-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE SHORTER THAN A HALF-WAVE ACT AS CAPACITIVE LOADS TO THE GENERATOR	6	4	13
0 929	03-16 DO YOU WORK WITH HERTZ ANTENNAS	7	7	8
0 930	03-17 DO YOU WORK WITH MARCONI ANTENNAS	2	2	3
0 931	03-18 DO YOU WORK WITH BROADSIDE ARRAYS	4	2	11
0 932	03-19 DO YOU WORK WITH END-FIRE ARRAYS	4	2	11
0 933	03-20 DO YOU WORK WITH CARDIOID ARRAYS	1	0	4
0 934	03-21 DO YOU WORK WITH COLLINEAR ARRAYS	4	1	12
0 935	03-22 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC INDUCTION FIELDS WHEN WORKING WITH ANTENNAS	6	3	13
0 936	03-23 DO YOU MEASURE ELECTROMAGNETIC INDUCTION FIELDS OF ANTENNAS	1	1	1
0 937	03-24 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC RADIATION FIELDS WHEN WORKING WITH ANTENNAS	7	5	12
0 938	03-25 DO YOU MEASURE ELECTROMAGNETIC RADIATION FIELDS OF ANTENNAS	3	2	8
0 939	03-26 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E) AND MAGNETIC (H) COMPONENTS IN ANTENNA RADIATION	3	1	9
0 940	03-27 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E) AND MAGNETIC (H) COMPONENTS IN ANTENNA INDUCTION FIELD	2	1	8
0 941	03-28 ARE ANY OF THE ANTENNAS YOU WORK ON LINEARLY POLARIZED	8	6	8
0 942	03-29 ARE ANY OF THE ANTENNAS YOU WORK ON CIRCULARLY POLARIZED	14	14	16
0 943	03-30 DO YOU MEASURE OR DETERMINE THE POLARITY OF ANTENNAS YOU WORK ON	5	4	5
0 944	03-31 DO YOU CONSTRUCT, OR MAKE THE CALCULATIONS NECESSARY TO CONSTRUCT, ANTENNAS OF CORRECT LENGTH FOR SPECIFIC WAVELENGTHS	7	6	8

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078	
O	945	03-32 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS	5	4	9	
O	946	03-33 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS SERVING AS DIRECTORS	4	2	9	
O	947	03-34 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS SERVING AS REFLECTORS	5	4	9	
O	948	03-35 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN DON'T REMEMBER WHAT KIND OF ELEMENTS	8	8	8	
O	949	03-36 DO YOU WORK ON UNIDIRECTIONAL ANTENNAS	18	17	24	
O	950	03-37 DO YOU WORK ON BIDIRECTIONAL ANTENNAS	7	5	12	
O	951	03-38 DO YOU WORK ON DON'T REMEMBER THE DIRECTIONALITY	5	3	9	
O	952	03-39 DO YOU WORK WITH ROTAR ANTENNA ARRAYS	4	5	1	
P	953	P1-01 IN YOUR PRESENT JOB DO YOU WORK WITH TRANSMISSION LINES (TRANSMISSION LINES ARE DEFINED TO INCLUDE LEADS BETWEEN RECEIVERS AND ANTENNAS, TELEPHONE LEADS, AS WELL AS HIGH VOLTAGE POWER LINES, ETC. DO NOT CONSIDER WAVEGUIDES AS TRANSMISSION LINES	28	28	29	TRANSMISSION LINES
P	954	P1-02 DO YOU REFER TO OR USE COPPER LOSS OR I2R LOSS IN TRANSMISSION LINES	6	4	13	
P	955	P1-03 DO YOU REFER TO OR USE SKIN EFFECTS OF HIGH FREQUENCY CURRENTS IN TRANSMISSION LINES	6	4	13	
P	956	P1-04 DO YOU REFER TO OR USE RADIATION LOSS IN TRANSMISSION LINES	11	9	16	
P	957	P1-05 DO YOU USE OR REFER TO DIELECTRIC LOSS IN TRANSMISSION LINES	6	4	13	
P	958	P1-06 DO YOU USE OR REFER TO LEAKAGE LOSSES IN TRANSMISSION LINES	11	10	14	
P	959	P1-07 DO YOU WORK WITH TWISTED PAIR TRANSMISSION LINES	10	10	11	
P	960	P1-08 DO YOU WORK WITH TWIN LEAD TRANSMISSION LINES	8	7	13	
P	961	P1-09 DO YOU WORK WITH OPEN TWO-WIRE TRANSMISSION LINES	6	4	9	
P	962	P1-10 DO YOU WORK WITH FLEXIBLE COAXIAL CABLE TRANSMISSION LINES	24	27	25	
P	963	P1-11 DO YOU WORK WITH RIGID COAXIAL CABLE TRANSMISSION LINES	12	11	16	
P	964	P1-12 DO YOU TROUBLESHOOT TRANSMISSION LINES	20	22	16	
P	965	P1-13 DO YOU ANALYZE VOLTAGE OR CURRENT WAVEFORMS IN TRANSMISSION LINES TO DETERMINE THE TYPE OF TERMINATION (OPEN, SHORTED, CAPACITIVE, INDUCTIVE)	7	4	16	
P	966	P1-14 DO YOU SELECT APPROPRIATE TRANSMISSION LINES TERMINATIONS TO ACHIEVE DESIRED WAVEFORMS	5	5	7	
P	967	P1-15 DO YOU USE OR REFER TO SCHEMATIC SYMBOLS FOR LINE TERMINATIONS IN TERMS OF CIRCUIT TERMINATIONS	10	9	13	
P	968	P1-16 DO YOU MEASURE STANDING WAVE RATIOS (SR) OF TRANSMISSION LINES	8	8	11	
P	969	P1-17 DO YOU CALCULATE STANDING WAVE RATIOS (SWR) OF TRANSMISSION LINES	7	5	14	
P	970	P1-18 DO YOU PERFORM THE CALCULATIONS NECESSARY TO DETERMINE THE IMPEDANCE AND LENGTH OF QUARTER - WAVELENGTH MATCHING TRANSFORMERS TO MATCH TRANSMISSION LINES TO LOADS	3	2	5	

PCT MBRS RESPONDING 'YES' BY SELECTED GMPS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
P 971	P1-19 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING MATCHING TRANSFORMERS	4	3	5	
P 972	P1-20 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING DELTA MATCHING	2	2	4	
P 973	P1-21 DO YOU SELECT THE TYPE OF TRANSMISSION LINE NEEDED FOR PARTICULAR JOBS WITHOUT REFERRING TO TECHNICAL DATA	5	4	7	
P 974	P1-22 DO YOU USE OR REFER TO THE TERM CHARACTERISTIC IMPEDANCE (Z0) OF TRANSMISSION LINES	9	7	16	
P 975	P1-23 DO YOU CALCULATE THE CHARACTERISTIC IMPEDANCE (Z0) OF TRANSMISSION LINES	3	1	9	
P 976	P1-24 DO YOU USE OR REFER TO THE TERM CUTOFF FREQUENCY OF TRANSMISSION LINES	2	1	4	
P 977	P1-25 DO YOU USE OR REFER TO THE TERM VELOCITY FACTOR (K) OF TRANSMISSION LINES	1	1	1	
P 978	P1-26 DO YOU COMPUTE THE ELECTRICAL LENGTH OF TRANSMISSION LINES FOR PARTICULAR FREQUENCIES	4	2	9	
P 979	P1-27 DO YOU CONSTRUCT TRANSMISSION LINES OF PARTICULAR ELECTRICAL LENGTH FOR GIVEN FREQUENCIES	3	4	0	
P 980	P1-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT AS THE FREQUENCY INCREASES AND THE PHYSICAL LENGTH OF TRANSMISSION LINES REMAIN CONSTANT, THE ELECTRICAL LENGTH INCREASES	5	3	9	
P 981	P1-29 DO YOU WORK WITH NONRESONANT (FLAT) TRANSMISSION LINES	4	4	3	
P 982	P1-30 DO YOU WORK WITH RESONANT TRANSMISSION LINES	3	2	5	
P 983	P1-31 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING STUB MATCHING	1	2	0	
P 984	P2-01 DO YOU WORK WITH WAVEGUIDES OR CAVITY RESONATORS IN YOUR PRESENT JOB	8	5	17	WAVEGUIDES AND CAVITY RESONATORS
P 985	P2-02 DO YOU INSPECT WAVEGUIDES OR CAVITY RESONATORS	5	4	8	
P 986	P2-03 DO YOU CLEAN WAVEGUIDES OR CAVITY RESONATORS	4	3	7	
P 987	P2-04 DO YOU BEND WAVEGUIDES OR CAVITY RESONATORS	1	2	0	
P 988	P2-05 DO YOU TWIST WAVEGUIDES OR CAVITY RESONATORS	1	2	0	
P 989	P2-06 DO YOU PRESSURIZE WAVEGUIDES OR CAVITY RESONATORS	1	1	0	
P 990	P2-07 DO YOU PURGE WAVEGUIDES OR CAVITY RESONATORS	1	1	0	
P 991	P2-08 DO YOU TROUBLESHOOT WAVEGUIDES OR CAVITY RESONATORS	2	2	3	
P 992	P2-09 DO YOU REMOVE OR INSTALL COMPLETE WAVEGUIDES	4	3	9	
P 993	P2-10 DO YOU REMOVE OR INSTALL WAVEGUIDE SECTIONS	4	3	9	
P 994	P2-11 DO YOU REMOVE OR INSTALL DUMMY LOADS	4	3	9	
P 995	P2-12 DO YOU REMOVE OR INSTALL E BENDS	2	1	4	
P 996	P2-13 DO YOU REMOVE OR INSTALL H BENDS	2	1	4	
P 997	P2-14 DO YOU REMOVE OR INSTALL OTHER BENDS	2	2	5	
P 998	P2-15 DO YOU REMOVE OR INSTALL CHOKE JOINTS	2	1	3	
P 999	P2-16 DO YOU REMOVE OR INSTALL ROTATING JOINTS	2	2	3	
P1000	P2-17 DO YOU REMOVE OR INSTALL DIRECTIONAL COUPLERS	4	3	7	
P1001	P2-18 DO YOU REMOVE OR INSTALL BIDIRECTIONAL COUPLERS	4	2	8	
P1002	P2-19 DO YOU USE OR REFER TO 'A' WALL OF WAVEGUIDES	1	0	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

BY-TSK		SPC 076	SPC 077	SPC 078
P1003	P2-20 DO YOU USE OR REFER TO "B" WALL OF WAVEGUIDES	1	0	3
P1004	P2-21 DO YOU USE OR REFER TO CUTOFF FREQUENCY OF WAVEGUIDES	2	1	8
P1005	P2-22 DO YOU USE OR REFER TO FREQUENCY-DETERMINING WALL OF WAVEGUIDES	2	1	7
P1006	P2-23 DO YOU USE OR REFER TO POWER-DETERMINING WALL OF WAVEGUIDES	2	1	4
P1007	P2-24 DO YOU USE OR REFER TO ELECTRIC FIELD BOUNDARY CONDITIONS	2	0	8
P1008	P2-25 DO YOU USE OR REFER TO MAGNETIC FIELD BOUNDARY CONDITIONS	2	0	8
P1009	P2-26 DO YOU USE OR REFER TO DUPLEXER FIELD BOUNDARY CONDITIONS	1	0	1
P1010	P2-27 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST WAVEGUIDES ARE MADE WITH A "B" WALL SIZE OF .7 WAVELENGTHS OF THE OPERATING FREQUENCY	1	0	3
P1011	P2-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST "A" WALLS RANGE FROM .2 TO .5 WAVELENGTHS IN SIZE, WITH .35 USED AS AN AVERAGE	1	0	1
P1012	P2-29 ARE YOU CONCERNED WITH THE MATERIAL (SUCH AS BRASS) WHICH WAVEGUIDES ARE MADE OF	2	1	3
P1013	P2-30 DO YOU COMPUTE THE LENGTH OF A WAVEGUIDE FOR SPECIFIC INSTALLATION	1	1	1
P1014	P2-31 DO YOU USE THE RIGHT HAND RULE TO DETERMINE THE DIRECTION OF PROPAGATION, DIRECTION OF "E" FIELD, OR DIRECTION OF "H" FIELD IN WAVEGUIDES	2	0	8
P1015	P2-32 DO YOU USE OR REFER TO THE TIME PHASE OF PEAK "E" OR "H" LINES IN WAVEGUIDES	2	0	9
P1016	P2-33 DO YOU MEASURE THE TIME PHASE OF "E" OR "H" LINES IN WAVEGUIDES	1	0	4
P1017	P2-34 DO YOU USE OR REFER TO THE SPACE QUADRATURE OF "E" OR "H" LINES IN WAVEGUIDES	2	0	8
P1018	P2-35 ARE HIGH POWER PROBES USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	1	0	4
P1019	P2-36 ARE LOW POWER PROBES USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	1	5
P1020	P2-37 ARE LOOPS USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	1	7
P1021	P2-38 ARE APERTURES (WINDOWS OR IRISES) USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	0	8
P1022	P2-39 ARE DON'T REMEMBER THE KIND OF ENERGY COUPLING USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	2	1
P1023	P2-40 DO YOU DETERMINE WHERE PROBES SHOULD BE MOUNTED IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	1	0	3
P1024	P2-41 DO YOU DETERMINE THE POSITIONING OF LOOPS IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	1	0	3

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 076	SPC 077	SPC 078	
P1025	P2-42 DO YOU DETERMINE THE POSITIONING OR SIZE OF APERTURES IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	0	0	0	
P1026	P2-43 ARE CHOKE JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	2	3	
P1027	P2-44 ARE ROTATING JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	1	5	
P1028	P2-45 ARE DON'T REMEMBER THE KIND OF JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	2	1	3	
P1029	P2-46 DO YOU TUNE CAVITY RESONATORS USING CAPACITIVE TUNING	2	2	4	
P1030	P2-47 DO YOU TUNE CAVITY RESONATORS USING INDUCTIVE TUNING	2	1	3	
P1031	P2-48 DO YOU TUNE CAVITY RESONATORS USING VOLUME TUNING	2	1	5	
P1032	P2-49 DO YOU TUNE CAVITY RESONATORS USING DON'T REMEMBER THE METHOD OF TUNING	1	1	1	
P1033	P2-50 DO YOU MEASURE THE FREQUENCY OF SIGNALS IN CAVITY RESONATORS	3	3	4	
P1034	P3-01 IN YOUR PRESENT JOB DO YOU WORK WITH KLYSTRONS, TRAVELING WAVE TUBES (TWT), PARAMETRIC AMPLIFIERS, OR MAGNETRONS	10	8	16	MICROWAVE AMPLIFIERS AND OSCILLATORS
P1035	P3-02 DO YOU USE OR REFER TO INTERELECTRODE CAPACITANCE	4	1	12	
P1036	P3-03 DO YOU USE OR REFER TO ELECTRON TRANSIT TIME	3	0	12	
P1037	P3-04 DO YOU USE OR REFER TO LEAD INDUCTANCE	3	0	11	
P1038	P3-05 DO YOU USE OR REFER TO RF LOSSES IN EXTERNAL CIRCUITRY	7	5	13	
P1039	P3-06 DO YOU USE OR REFER TO PRINCIPLE OF ELECTRON VELOCITY MODULATION	3	1	9	
P1040	P3-07 DO YOU USE OR REFER TO ELECTRON BUNCHING	3	1	9	
P1041	P3-08 DO YOU WORK WITH TWO-CAVITY KLYSTRONS	1	1	1	
P1042	P3-09 DO YOU WORK WITH THREE-CAVITY KLYSTRONS	1	0	1	
P1043	P3-10 DO YOU WORK WITH REFLEX KLYSTRONS	4	2	9	
P1044	P3-11 DO YOU WORK WITH TRAVELING-WAVE TUBES (TWT)	6	6	7	
P1045	P3-12 DO YOU WORK WITH NONDEGENERATIVE PARAMETRIC AMPLIFIERS	4	4	5	
P1046	P3-13 DO YOU WORK WITH UP-CONVERTER PARAMETRIC AMPLIFIERS	3	2	4	
P1047	P3-14 DO YOU WORK WITH MAGNETRONS	2	0	7	
P1048	P3-15 DO YOU INSPECT KLYSTRONS OR TWT	3	2	5	
P1049	P3-16 DO YOU CLEAN KLYSTRONS OR TWT	2	2	3	
P1050	P3-17 DO YOU TUNE KLYSTRONS OR TWT ELECTRICALLY	1	1	3	
P1051	P3-18 DO YOU TUNE KLYSTRONS OR TWT MECHANICALLY	2	1	5	
P1052	P3-19 DO YOU PERFORM OPERATIONAL CHECKS OF KLYSTRONS OR TWT	5	5	4	
P1053	P3-20 DO YOU TROUBLESHOOT KLYSTRONS OR TWT	2	2	1	
P1054	P3-21 DO YOU REMOVE OR REPLACE COMPLETE KLYSTRON OR TWT	4	4	3	
P1055	P3-22 DO YOU REMOVE OR REPLACE KLYSTRON OR TWT COMPONENTS	1	1	0	
P1056	P3-23 DO YOU INSPECT PARAMETRIC AMPLIFIERS	4	4	3	
P1057	P3-24 DO YOU CLEAN PARAMETRIC AMPLIFIERS	3	4	3	
P1058	P3-25 DO YOU ADJUST PARAMETRIC AMPLIFIERS	3	3	4	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

BY-TSK	SPC 076	SPC 077	SPC 078
P1059 P3-26 DO YOU TUNE PARAMETRIC AMPLIFIERS	3	3	3
P1060 P3-27 DO YOU PERFORM OPERATIONAL CHECKS OF PARAMETRIC AMPLIFIERS	5	6	3
P1061 P3-28 DO YOU TROUBLESHOOT PARAMETRIC AMPLIFIERS	3	4	3
P1062 P3-29 DO YOU REMOVE OR REPLACE COMPLETE PARAMETRIC AMPLIFIER	4	4	4
P1063 P3-30 DO YOU REMOVE OR REPLACE PARAMETRIC AMPLIFIER COMPONENTS	3	3	3
P1064 P3-31 DO YOU INSPECT MAGNETRONS	1	0	3
P1065 P3-32 DO YOU CLEAN MAGNETRONS	1	0	1
P1066 P3-33 DO YOU ADJUST MAGNETRONS	1	0	3
P1067 P3-34 DO YOU TUNE MAGNETRONS	1	0	3
P1068 P3-35 DO YOU PERFORM OPERATIONAL CHECKS OF MAGNETRONS	1	0	1
P1069 P3-36 DO YOU TROUBLESHOOT MAGNETRONS	1	0	1
P1070 P3-37 DO YOU REMOVE OR REPLACE COMPLETE MAGNETRON	1	0	1
P1071 P3-38 DO YOU REMOVE OR REPLACE MAGNETRON COMPONENTS	1	0	1
P1072 P3-39 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS COLLECTOR PLATES	2	0	8
P1073 P3-40 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATCHER CAVITIES	2	0	8
P1074 P3-41 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATCHER GRIDS	2	0	8
P1075 P3-42 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS FEEDBACK LOOPS	1	0	5
P1076 P3-43 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS DRIFT SPACES	2	0	8
P1077 P3-44 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS BUNCHER GRIDS	2	0	8
P1078 P3-45 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS BUNCHER CAVITIES	1	0	4
P1079 P3-46 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CONTROL GRIDS	2	0	7
P1080 P3-47 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATHODES	2	0	8
P1081 P3-48 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON REPELLER (REFLECTOR) PLATES	3	1	12
P1082 P3-49 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON GRIDS	3	1	12
P1083 P3-50 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON GRID CAVITY GAPS	2	0	9
P1084 P3-51 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON RESONANT CAVITIES	3	1	12
P1085 P3-52 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON MAGNETIC COUPLING LOOPS	2	0	9
P1086 P3-53 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON FILAMENTS	2	1	7
P1087 P3-54 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON CATHODES	3	1	12

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 076	SPC 077	SPC 078	
P1088	P3-55 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON OUTPUT LEADS	2	1	7	
P1089	P3-56 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES FILAMENTS	2	1	5	
P1090	P3-57 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES CATHODES	3	1	9	
P1091	P3-58 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES MODULATOR GRIDS	2	1	7	
P1092	P3-59 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES ANODES	3	1	9	
P1093	P3-60 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES HELIXES	3	2	9	
P1094	P3-61 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES COLLECTORS	2	0	9	
P1095	P3-62 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES MAGNETS	2	1	8	
P1096	P3-63 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES ATTENUATORS	3	2	7	
P1097	P3-64 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE CIRCULATORS	1	1	1	
P1098	P3-65 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER SIGNAL CAVITIES	2	2	1	
P1099	P3-66 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER IDLER CAVITIES	2	2	1	
P1100	P3-67 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER VARACTON DIODES	2	2	1	
P1101	P3-68 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE ISOLATORS	1	0	1	
P1102	P3-69 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER REVERSE-BIAS BATTERIES	0	0	1	
P1103	P3-70 DO YOU PERFORM TASKS ON ANODES	2	1	5	
P1104	P3-71 DO YOU PERFORM TASKS ON ANODE COOLING PINS	1	0	4	
P1105	P3-72 DO YOU PERFORM TASKS ON COUPLING LOOPS	2	0	5	
P1106	P3-73 DO YOU PERFORM TASKS ON HEATER LEADS	1	0	3	
P1107	P3-74 DO YOU PERFORM TASKS ON RESONANT CAVITIES	1	0	5	
P1108	P3-75 DO YOU PERFORM TASKS ON CATHODES	2	0	5	
P1109	P3-76 DO YOU PERFORM TASKS ON MAGNETS	2	0	5	
Q1110	Q1-01 DO YOU USE OR REFER TO STORAGE REGISTERS	32	33	29	
Q1111	Q1-02 DO YOU USE OR REFER TO SHIFT REGISTERS	32	34	26	
Q1112	Q1-03 DO YOU USE OR REFER TO LOGIC SYMBOLS OF SHIFT REGISTERS	27	27	26	REGISTERS
Q1113	Q1-04 DO YOU USE OR REFER TO LOGIC SYMBOLS OF STORAGE REGISTERS	27	27	26	
Q1114	Q1-05 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	26	25	26	
Q1115	Q1-06 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF REGISTERS	24	23	28	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 076	SPC 077	SPC 078	
Q1116	Q1-07 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP OF A SHIFT REGISTER AFTER A SPECIFIED NUMBER OF SHIFT PULSES HAVE PASSED	20	20	20	
Q1117	Q2-01 DO YOU WORK WITH DIGITAL COUNTERS, REGISTERS, OR STORAGE DEVICES IN YOUR PRESENT JOB	37	38	34	
Q1118	Q2-02 DO YOU USE OR REFER TO DELAY LINES	18	16	24	STORAGE DEVICES
Q1119	Q2-03 DO YOU USE OR REFER TO MAGNETIC CORES	21	19	25	
Q1120	Q2-04 DO YOU USE OR REFER TO MAGNETIC DRUMS	10	8	16	
Q1121	Q2-05 DO YOU USE OR REFER TO MAGNETIC TAPES	31	31	30	
Q1122	Q2-06 DO YOU USE OR REFER TO ACCESS TIME OR SPEED OR MEMORY SYSTEMS	20	20	22	
Q1123	Q2-07 DO YOU USE OR REFER TO WORD CAPACITY OF MEMORY SYSTEMS	22	23	20	
Q1124	Q2-08 DO YOU USE OR REFER TO VOLATILITY OF MEMORY SYSTEMS	11	11	8	
Q1125	Q2-09 DO YOU USE OR REFER TO LOGIC SYMBOL OF DELAY LINES	16	14	20	
Q1126	Q3-01 IN YOUR PRESENT JOB, DO YOU WORK WITH DIGITAL-TO-ANALOG (D/A) CONVERTERS, ANALOG-TO-DIGITAL (A/D) CONVERTERS, OR BINARY-TO-DECIMAL READOUT CONVERTERS	34	34	32	DIGITAL TO ANALOG CONVERTERS
Q1127	Q3-02 DO YOU COMPUTE OUTPUT VOLTAGES FOR ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS FOR GIVEN INPUT VOLTAGES	14	11	25	
Q1128	Q3-03 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE COUNT IN ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS IS DETERMINED BY ADDING THE DENOMINATORS OF THE RESISTORS	10	8	17	
Q1129	Q3-04 DO YOU COMPUTE ANALOG VOLTAGES FOR GIVEN BINARY COUNTS IN ELECTRONIC DIGITAL-TO-ANALOG (D/A) CONVERTERS	16	13	25	
Q1130	Q3-05 DO YOU PERFORM SAMPLE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	10	10	11	
Q1131	Q3-06 DO YOU PERFORM HOLD FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	8	8	9	
Q1132	Q3-07 DO YOU PERFORM COMPARE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	7	7	8	
Q1131	Q3-08 DO YOU PERFORM DIGITIZE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	10	11	8	
Q1134	Q3-09 DO YOU PERFORM DON'T REMEMBER WHICH FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	8	9	5	
Q1135	Q3-10 DO YOU USE OR REFER TO SAMPLE FUNCTION OF A/D CONVERTERS	12	12	14	
Q1136	Q3-11 DO YOU USE OR REFER TO HOLD FUNCTION OF A/D CONVERTERS	11	10	14	
Q1137	Q3-12 DO YOU USE OR REFER TO COMPARE FUNCTION OF A/D CONVERTERS	9	7	16	
Q1138	Q3-13 DO YOU USE OR REFER TO DIGITAL FUNCTION OF A/D CONVERTERS	12	12	14	
Q1139	Q3-14 DO YOU PERFORM ANY TASKS ON MECHANICAL ANALOG-TO-DIGITAL (A/D) CONVERTERS	7	6	4	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	UY-TSK	SPC 076	SPC 077	SPC 078	
R1140	R1-01 DO YOU WORK WITH PHANTASTRON CIRCUITRY IN YOUR PRESENT JOB	3	0	11	
R1141	R2-01 IN YOUR PRESENT JOB DO YOU WORK WITH SCHMITT TRIGGER CIRCUITS	25	24	26	
R1142	R2-02 DO YOU TRACE DATA FLOW THROUGH SCHMITT TRIGGER SCHEMATIC DIAGRAMS	19	20	16	SCHMITT TRIGGERS
R1143	R2-03 DO YOU USE OR REFER TO SCHMITT TRIGGER LOGIC SYMBOLS	17	17	16	
R1144	R3-01 IN YOUR PRESENT JOB DO YOU FABRICATE MULTICONDUCTOR CABLES	52	59	29	CABLE FABRICATION
R1145	R3-02 DO YOU FABRICATE COAXIAL CABLES	56	62	37	
S1146	S1-01 IN YOUR PRESENT JOB DO YOU PERFORM ANY TASKS ON VISUAL READOUT SYSTEMS	47	49	41	INPUT/OUTPUT DEVICES
S1147	S1-02 DO YOU PERFORM ANY TASKS ON NIXIE LIGHTS OR NIXIE LIGHT DECODER SYSTEMS	27	30	20	
S1148	S1-03 DO YOU ANALYZE NIXIE LIGHT DECODER SYSTEMS USING BOOLEAN ALGEBRA	7	8	5	
S1149	S2-01 DO YOU WORK WITH PHOTO TUBES IN YOUR PRESENT JOB	14	14	12	PHOTO SENSITIVE DEVICES
S1150	S3-01 IN YOUR PRESENT JOB DO YOU WORK WITH CHOPPER CIRCUITS	12	11	4	
S1151	S3-02 DO YOU MEASURE EXCITATION FREQUENCIES	5	5	4	
S1152	S3-03 DO YOU MEASURE VOLTAGE-CURRENT PHASE RELATIONSHIPS	5	5	5	
S1153	S3-04 DO YOU USE OR REFER TO EXCITATION FREQUENCIES	4	4	3	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)
S1154	S3-05 DO YOU USE OR REFER TO VOLTAGE-CURRENT PHASE RELATIONSHIPS	6	5	7	
S1155	S3-06 DO YOU USE SERVOS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	5	4	7	
S1156	S3-07 DO YOU USE DETECTORS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	5	5	7	
S1157	S3-08 DO YOU USE ERROR SIGNAL DEVICES IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	8	8	9	
S1158	S3-09 DO YOU USE COMPARISON CIRCUITS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	8	9	8	
T1159	T1-01 DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH INFRARED SYSTEMS	6	7	0	
T1160	T1-02 DO YOU INSPECT INFRARED SYSTEMS	5	7	0	INFRARED
T1161	T1-03 DO YOU CLEAN INFRARED SYSTEMS	4	5	0	
T1162	T1-04 DO YOU ADJUST OR CALIBRATE INFRARED SYSTEMS	5	6	0	
T1163	T1-05 DO YOU OPERATE INFRARED SYSTEMS	5	7	0	
T1164	T1-06 DO YOU TROUBLESHOOT WIRE CONNECTIONS OF INFRARED SYSTEMS	5	7	0	
T1165	T1-07 DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF INFRARED SYSTEMS	4	6	0	
T1166	T1-08 DO YOU TROUBLESHOOT DOWN TO INFRARED SYSTEM COMPONENT PARTS	4	5	0	
T1167	T1-09 DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF INFRARED SYSTEMS	5	7	1	
T1168	T1-10 DO YOU REMOVE OR REPLACE INFRARED SYSTEM COMPONENT PARTS	5	6	1	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 076	SPC 077	SPC 078	
T1169	T1-11	DO YOU USE OR REFER TO FAR REGION	3	4	3	
T1170	T1-12	DO YOU USE OR REFER TO INTERMEDIATE REGION	3	4	3	
T1171	T1-13	DO YOU USE OR REFER TO NEAR REGION	3	4	3	
T1172	T1-14	DO YOU USE OR REFER TO MICRON	4	4	3	
T1173	T1-15	DO YOU USE OR REFER TO GRAY BODIES	2	3	1	
T1174	T1-16	DO YOU USE OR REFER TO BLACK BODIES	3	4	1	
T1175	T1-17	DO YOU USE OR REFER TO ABSORPTION	4	4	3	
T1176	T1-18	DO YOU USE OR REFER TO SCATTERING	4	5	3	
T1177	T1-19	DO YOU USE OR REFER TO ABSOLUTE ZERO	3	3	3	
T1178	T1-20	DO YOU PERFORM TASKS ON BLITZ	1	0	1	
T1179	T1-21	DO YOU PERFORM TASKS ON TARGET BUTTONS	1	0	1	
T1180	T1-22	DO YOU PERFORM TASKS ON ERECTOR LENSES	2	2	1	
T1181	T1-23	DO YOU PERFORM TASKS ON OCULAR LENSES	2	3	1	
T1182	T1-24	DO YOU PERFORM TASKS ON CORRECTION LENSES	2	2	1	
T1183	T1-25	DO YOU PERFORM TASKS ON FILTERS	3	4	3	
T1184	T1-26	DO YOU PERFORM TASKS ON SPHERICAL MIRRORS	2	3	1	
T1185	T1-27	DO YOU PERFORM TASKS ON PLANE MIRRORS	2	2	3	
T1186	T2-01	DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH LASERS	13	11	18	
T1187	T2-02	DO YOU INSPECT LASER SYSTEMS	8	10	3	LASERS
T1188	T2-03	DO YOU CLEAN LASER SYSTEMS	7	9	3	
T1189	T2-04	DO YOU OPERATE LASER SYSTEMS	10	11	5	
T1190	T2-05	DO YOU OPERATE LASER SYSTEMS	10	11	5	
T1191	T2-06	DO YOU TROUBLESHOOT WIRE CONNECTIONS OF LASER SYSTEMS	8	10	1	
T1192	T2-07	DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF LASER SYSTEMS	6	8	1	
T1193	T2-08	DO YOU TROUBLESHOOT TO COMPONENT PARTS OF LASER SYSTEMS	6	7	1	
T1194	T2-09	DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF LASER SYSTEMS	7	8	1	
T1195	T2-10	DO YOU REMOVE OR REPLACE COMPONENT PARTS OF LASER SYSTEMS	6	8	1	
T1196	T2-11	DO YOU USE OR REFER TO ANGSTROMS (A)	8	7	11	
T1197	T2-12	DO YOU USE OR REFER TO ELECTRON ENERGY LEVELS	8	6	16	
T1198	T2-13	DO YOU USE OR REFER TO GROUND STATE	7	5	14	
T1199	T2-14	DO YOU USE OR REFER TO EXCITED STATE	8	6	16	
T1200	T2-15	DO YOU USE OR REFER TO PACKET OF RADIATION	4	2	11	
T1201	T2-16	DO YOU USE OR REFER TO PHOTONS	9	7	16	
T1202	T2-17	DO YOU USE OR REFER TO SPONTANEOUS EMISSION	8	6	14	
T1203	T2-18	DO YOU USE OR REFER TO STIMULATED EMISSION	8	7	14	
T1204	T2-19	DO YOU USE OR REFER TO COHERENCE OR INCOHERENCE	9	7	16	
T1205	T2-20	DO YOU USE OR REFER TO INVERSION LEVEL	4	3	7	
T1206	T2-21	DO YOU USE OR REFER TO MONOCHROMATIC	5	4	8	
T1207	T2-22	DO YOU WORK WITH ACTIVE MATERIALS	5	4	5	
T1208	T2-23	DO YOU WORK WITH PUMPING SOURCES	6	6	8	
T1209	T2-24	DO YOU WORK WITH FULL SILVERED (100% REFLECTIVE) MIRRORS	8	9	7	

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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	By-TSK	SPC 076	SPC 077	SPC 078	
T1210	T2-25 DO YOU WORK WITH HALF SILVERED (92% REFLECTIVE) MIRRORS	7	8	5	
T1211	T2-26 DO YOU WORK WITH HELICAL FLASHTUBES	4	3	7	
T1212	T2-27 DO YOU WORK WITH RUBY	4	4	4	
T1213	T2-28 DO YOU WORK WITH HELIUM-NEON	8	9	4	
T1214	T2-29 DO YOU WORK WITH HELIUM-XENON	2	2	1	
T1215	T2-30 DO YOU WORK WITH XENON	2	3	1	
T1216	T2-31 DO YOU WORK WITH CESIUM-MELIUM	2	2	1	
T1217	T2-32 DO YOU WORK WITH ARGON	6	7	3	
T1218	T2-33 DO YOU WORK WITH NEODYMIUM IN GLASS	2	2	1	
T1219	T2-34 DO YOU WORK WITH GALLIUM ARSENIDE	3	3	1	
T1220	T3-01 IN YOUR PRESENT JOB DO YOU WORK WITH DISPLAY TUBES, SUCH AS DIRECT VIEW STORAGE (DVST) OR MULTIPLE MODE STORAGE TUBES (MMST)	3	3	4	DISPLAY TUBES
T1221	T3-02 DO YOU INSPECT DVST OR MMST	2	1	3	
T1222	T3-03 DO YOU CLEAN DVST OR MMST	2	2	3	
T1223	T3-04 DO YOU ADJUST OR CALIBRATE DVST OR MMST	2	2	1	
T1224	T3-05 DO YOU OPERATE SYSTEMS THAT CONTAIN DVST OR MMST	2	2	3	
T1225	T3-06 DO YOU TROUBLESHOOT DVST OR MMST CIRCUITS	1	1	1	
T1226	T3-07 DO YOU REMOVE OR REPLACE DVST OR MMST TUBES FROM MAJOR ASSEMBLIES OR UNITS	1	1	3	
T1227	T3-08 DO YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME THE VARIOUS ELEMENTS OF DVST	1	1	3	
T1228	T3-09 DO YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME THE VARIOUS ELEMENTS OF MMST	0	0	0	
T1229	T3-10 DO YOU PERFORM TASKS ON FLOOD GUNS	1	1	0	
T1230	T3-11 DO YOU PERFORM TASKS ON WRITE GUNS	1	1	0	
T1231	T3-12 DO YOU PERFORM TASKS ON ATTACK GUNS	0	0	0	
T1232	T3-13 DO YOU PERFORM TASKS ON ERASE GUNS	1	1	0	
T1233	T3-14 DO YOU PERFORM TASKS ON STORAGE GRIDS	2	1	3	
U1234	U1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY PROGRAMMING TASKS	23	23	24	PROGRAMMING
U1235	U1-02 DO YOU USE OR REFER TO DECIMAL SYSTEMS	20	20	21	
U1236	U1-03 DO YOU USE OR REFER TO PROGRAMS	22	22	22	
U1237	U1-04 DO YOU USE OR REFER TO HEXIDECIMAL SYSTEMS	6	5	11	
U1238	U1-05 DO YOU USE OR REFER TO 8-4-2-1 SYSTEMS	10	9	13	
U1239	U1-06 DO YOU USE OR REFER TO FOUR SYSTEMS	5	4	8	
U1240	U1-07 DO YOU USE OR REFER TO BINARY SYSTEMS	19	18	24	
U1241	U1-08 DO YOU USE OR REFER TO TIME-SHARING	12	10	17	
U1242	U1-09 DO YOU USE OR REFER TO DATA WORDS	19	18	21	
U1243	U1-10 DO YOU USE OR REFER TO ADDRESS WORDS	20	20	20	
U1244	U1-11 DO YOU USE OR REFER TO ADDRESS/SUBADDRESS	17	16	18	
U1245	U1-12 DO YOU USE OR REFER TO STEERING/INFORMATION	10	9	13	
U1246	U1-13 DO YOU USE OR REFER TO INFORMATION WORDS	17	16	21	
U1247	U1-14 DO YOU PERFORM TASKS ON SINGLE LEVEL PROGRAMMING	13	13	14	
U1248	U1-15 DO YOU PERFORM TASKS ON MULTI-LEVEL PROGRAMMING	8	6	8	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

BY-TSK		SPC 074	SPC 077	SPC 078	
U1249	U1-16 DO YOU PERFORM TASKS ON INPUT DEVICES	16	15	17	
U1250	U1-17 DO YOU PERFORM TASKS ON STORAGE DEVICES	14	13	16	
U1251	U1-18 DO YOU PERFORM TASKS ON ARITHMETIC SECTIONS	11	9	17	
U1252	U1-19 DO YOU PERFORM TASKS ON CONTROL SECTIONS	14	13	17	
U1253	U1-20 DO YOU PERFORM TASKS ON OUTPUT DEVICES	14	13	16	
U1254	U1-21 DO YOU PERFORM TASKS ON POWER SUPPLIES	11	11	12	
U1255	U2-01 DO YOU USE DECIBELS TO EXPRESS AMPLIFICATION AND ATTENUATION	98	97	51	
U1256	U2-02 DO YOU USE LOGARITHMS TO COMPUTE OUTPUT POWER IN DECIBELS	12	12	13	DB AND POWER RATIOS
U1257	U2-03 DO YOU USE LOGARITHMS TO COMPUTE ATTENUATION IN DECIBELS	10	10	11	
U1258	U2-09 DUMMY TASK TO IDENTIFY INCUMBENTS WHO PERFORMED NO TASKS	1	1	1	